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JUN 81   F04704-80-C-0006

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1 OF 2

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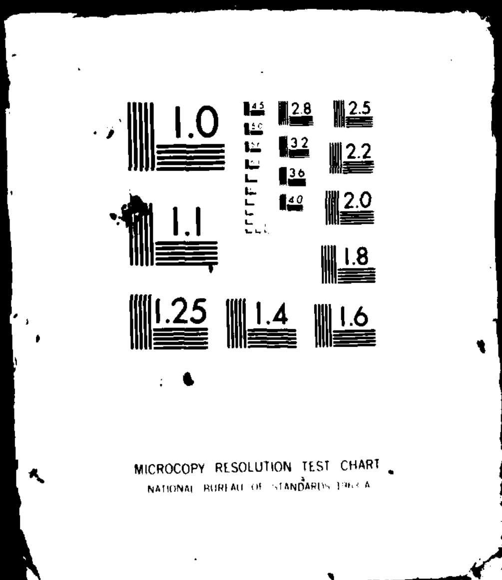

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VERIFICATION STUDY
PAHROC VALLEY, NEVADA
VOLUME II - GEOTECHNICAL DATA

PREPARED FOR
BALLISTIC MISSILE OFFICE (BMO)
NORTON AIR FORCE BASE, CALIFORNIA

Ertec
The Earth Technology Corporation

E-TR-27-PA-II

MX SITING INVESTIGATION
GEOTECHNICAL EVALUATION

VERIFICATION STUDY - PAHROC VALLEY NEVADA

VOLUME II - GEOTECHNICAL DATA

Prepared for:

U.S. Department of the Air Force
Ballistic Missile Office (BMO)
Norton Air Force Base, California 92409

Prepared by:

Ertec Western, Inc.
3777 Long Beach Boulevard
Long Beach, California 90807

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report contains the field data + lab test results from the Verification investigation of Pahroc Valley.

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FOREWORD

This volume of geotechnical data was compiled for the Department of the Air Force, Ballistic Missile Office (BMO), in compliance with Contract No. F04704-80-C-0006, CDRL Item 004A6. It contains the field data and laboratory test results from the Verification investigation of Pahroc Valley. A synthesis of these data are available in Volume I (E-TR-27-PA-I).

The data in each section of this volume are preceded by an explanation of the format and terms used in the compilation.

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1.0 ACTIVITY MAP AND GEOLOGRAPHIC COORDINATES

Explanation: Locations of all field activities are shown in Drawing II-1-1, Activity Location Map (in pocket). The geodetic and Universal Transverse Mercator (UTM) coordinates of all activities are listed in Table II-1-1.

PAHROC VALLEY ACTIVITY LOCATIONS

ACT ID.	GEODETIC COORD. LAT. DEG	MIN	LONG. DEG	MIN	UTM COORD. ZONE 12 N(KM)	E(KM)
BORING SITES						
PA- B01	37	38.59	115	4.90	4167.76	669.24
PA- B02	37	36.59	115	3.90	4164.08	670.79
PA- B03	37	35.50	115	5.58	4162.02	668.37
CPT SITES						
PA- C01	37	38.29	115	0.13	4167.34	676.28
PA- C02	37	38.05	115	1.20	4166.87	674.71
PA- C03	37	37.51	115	2.28	4165.83	673.15
PA- C04	37	36.91	115	3.17	4164.70	671.86
PA- C05	37	36.59	115	3.90	4164.08	670.79
PA- C06	37	38.59	115	4.90	4167.76	669.24
PA- C07	37	38.77	115	6.00	4168.04	667.62
PA- C08	37	38.96	115	7.05	4168.37	666.08
PA- C09	37	39.05	115	8.01	4168.51	664.66
PA- C10	37	36.51	115	5.03	4163.89	669.14
PA- C11	37	36.01	115	8.39	4162.87	664.21
PA- C12	37	35.87	115	7.45	4162.64	665.60
PA- C13	37	35.69	115	6.38	4162.35	667.18
PA- C14	37	35.50	115	5.58	4162.02	668.37
PA- C15	37	35.28	115	4.37	4161.65	670.15
PA- C16	37	35.00	115	2.93	4161.17	672.29
PA- C17	37	32.69	115	9.19	4156.71	663.15
PA- C18	37	31.92	115	8.36	4155.32	664.40
PA- C19	37	31.22	115	7.53	4154.04	665.65
PA- C20	37	30.42	115	6.51	4152.59	667.19
PA- C21	37	29.80	115	5.80	4151.46	668.26
PA- C22	37	36.82	114	56.74	4164.72	681.32
PA- C23	37	35.90	114	56.48	4163.03	681.75
PA- C24	37	35.11	114	55.95	4161.59	682.56
PA- C25	37	34.77	114	56.53	4160.95	681.71
PA- C26	37	34.15	114	57.37	4159.77	680.50
PA- C27	37	33.61	114	58.01	4158.76	679.58
PA- C28	37	32.90	114	58.65	4157.41	678.66
GEOLOGIC STATIONS						
PA-GS01	37	36.93	114	57.82	4164.90	679.73
PA-GS02	37	36.73	114	55.28	4164.61	683.47

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GEODETIC AND UTM COORDINATES
OF ACTIVITY LOCATIONS
PAHROC VALLEY, NEVADA
PAGE 1 OF 4

30 JUN 81

TABLE II-1-1

PAHROC VALLEY ACTIVITY LOCATIONS

ACT ID.	GEODETIC COORD. LAT. DEG	LAT. MIN	LONG. DEG	LONG. MIN	UTM COORD. ZONE 12 N(KM)	E(KM)
PA-GS03	37	37.05	115	1.55	4165.01	674.24
PA-GS04	37	35.48	115	5.46	4161.99	668.54
PA-GS05	37	36.00	115	8.48	4162.86	664.07
PA-GS06	37	32.46	115	9.06	4156.29	663.36
PA-GS07	37	34.39	115	4.41	4159.99	670.13
PA-GS08	37	39.54	115	4.74	4169.52	669.45
PA-GS09	37	39.00	115	7.69	4168.42	665.14
PA-GS10	37	36.60	115	1.68	4164.16	674.07
PA-GS11	37	34.95	115	3.12	4161.07	672.01
PA-GS12	37	34.76	115	4.09	4160.68	670.59
PA-GS13	37	32.64	115	6.29	4156.71	667.43
PA-GS14	37	31.37	115	6.07	4154.37	667.80
PA-GS15	37	29.59	115	5.28	4151.10	669.03
PA-GS16	37	30.96	115	7.27	4153.57	666.05
PA-GS17	37	31.20	115	9.16	4153.96	663.25
PA-GS18	37	32.68	115	9.51	4156.69	662.68
PA-GS19	37	32.55	115	10.02	4156.44	661.93
PA-GS20	37	33.25	115	9.25	4157.75	663.05
PA-GS21	37	34.91	115	7.81	4160.86	665.11
PA-GS22	37	36.02	115	8.64	4162.89	663.84
PA-GS23	37	36.30	115	7.18	4163.44	665.99
PA-GS24	37	36.49	115	6.48	4163.82	667.00
PA-GS25	37	36.76	115	2.61	4164.43	672.68
PA-GS26	37	37.93	115	1.08	4166.64	674.89
PA-GS27	37	38.88	115	1.18	4168.39	674.70
PA-GS28	37	38.19	115	3.25	4167.06	671.69
PA-GS29	37	36.70	115	3.41	4164.30	671.52
PA-GS30	37	39.69	115	8.56	4169.67	663.82
PA-GS31	37	36.03	115	7.74	4162.93	665.16
PA-GS32	37	34.03	115	8.06	4159.22	664.76
PA-GS33	37	37.55	115	8.89	4165.71	663.41
PA-GS34	37	35.83	114	59.59	4162.82	677.17
PA-GS35	37	34.64	114	58.45	4160.65	678.89
PA-GS36	37	33.72	114	57.81	4158.97	679.87
PA-GS37	37	31.62	114	58.75	4155.06	678.58
PA-GS38	37	30.10	114	59.87	4152.20	676.98
PA-GS39	37	35.00	114	56.15	4161.38	682.26
PA-GS40	37	36.03	114	57.80	4163.24	679.79
PA-GS41	37	31.33	114	56.08	4154.60	682.52
PA-GS42	37	30.45	114	57.68	4152.93	680.19

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OF ACTIVITY LOCATIONS
PAHROC VALLEY, NEVADA
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TABLE II-1-1

PAHROC VALLEY ACTIVITY LOCATIONS

ACT ID.	GEODETIC COORD. LAT. DEG	LAT. MIN	LONG. DEG	LONG. MIN	UTM COORD. ZONE 12 N(KM)	E(KM)
PA-GS43	37	32.29	114	59.21	4156.27	677.87
PA-GS44	37	33.21	114	57.47	4158.02	680.39
PA-GS45	37	35.47	114	55.14	4162.29	683.72
PA-GS46	37	35.81	114	54.61	4162.94	684.49
PA-GS47	37	36.21	114	59.57	4163.52	677.18
PA-GS48	37	33.49	115	0.33	4158.47	676.18
PA-GS49	37	32.69	114	55.78	4157.12	682.91
REFRACTION LINES						
PA- S01	37	38.29	115	0.13	4167.34	676.28
PA- S02	37	35.50	115	5.58	4162.02	668.37
PA- S03	37	35.00	115	2.93	4161.17	672.29
PA- S04	37	32.69	115	9.19	4156.71	663.15
PA- S05	37	29.80	115	5.80	4151.46	668.26
PA- S06	37	32.90	114	58.65	4157.41	678.66
PA- S07	37	35.11	114	55.95	4161.59	682.56
RESISTIVITY LINES						
PA- R01	37	38.29	115	0.13	4167.34	676.28
PA- R02	37	35.50	115	5.58	4162.02	668.37
PA- R03	37	35.00	115	2.93	4161.17	672.29
PA- R04	37	32.69	115	9.19	4156.71	663.15
PA- R05	37	29.80	115	5.80	4151.46	668.26
PA- R06	37	32.90	114	58.65	4157.41	678.66
PA- R07	37	35.11	114	55.95	4161.59	682.56
SURFICIAL SOIL SAMPLES						
PA-CS03	37	37.51	115	2.28	4165.83	673.15
PA-CS08	37	38.96	115	7.05	4168.37	666.08
PA-CS12	37	35.87	115	7.45	4162.64	665.60
PA-CS13	37	35.69	115	6.38	4162.35	667.18
PA-CS15	37	35.26	115	4.37	4161.61	670.15
PA-CS17	37	32.69	115	9.19	4156.71	663.15
PA-CS19	37	31.22	115	7.53	4154.04	665.65
PA-CS23	37	35.90	114	56.48	4163.03	681.75
PA-CS25	37	34.77	114	56.53	4160.95	681.71
PA-CS27	37	33.61	114	58.01	4158.01	679.58

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GEODETIC AND UTM COORDINATES OF ACTIVITY LOCATIONS PAHROC VALLEY, NEVADA

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TABLE II-1-1

PAHROC VALLEY ACTIVITY LOCATIONS

ACT ID.	GEODETIC COORD. LAT. DEG	LAT. MIN	LONG. DEG	LONG. MIN	UTM COORD. ZONE 12 N(KM)	E(KM)
TEST PITS						
PA- P01	37	30.42	115	6.51	4152.59	667.19
PA- P02	37	31.92	115	8.36	4155.32	664.40
PA- P03	37	36.01	115	8.39	4162.87	664.21
PA- P04	37	35.00	115	2.93	4161.17	672.29
PA- P05	37	38.77	115	6.00	4168.04	667.62
PA- P06	37	36.51	115	5.03	4163.89	669.14
PA- P07	37	36.91	115	3.17	4164.70	671.86
PA- P08	37	38.05	115	1.20	4166.87	674.71
PA- P09	37	35.11	114	55.95	4161.59	682.56
PA- P10	37	34.15	114	57.37	4159.77	680.50
PA- P11	37	32.90	114	58.65	4157.41	678.66
PA- P12	37	36.82	114	56.74	4164.72	681.32
TRENCH SITES						
PA- T01	37	29.80	115	5.80	4151.46	668.26
PA- T02	37	35.50	115	5.58	4162.02	668.37
PA- T03	37	39.05	115	8.01	4168.51	664.66
PA- T04	37	38.59	115	4.90	4167.76	669.24
PA- T05	37	36.59	115	3.90	4164.08	670.79
PA- T06	37	38.29	115	0.13	4167.34	676.28
WATER WELL SITES						
PA- W01	37	39.01	115	8.03	4168.43	664.63
PA- W02	37	38.07	115	5.07	4166.79	669.02
PA- W03	37	36.94	115	8.49	4164.58	664.03
PA- W04	37	35.83	115	7.49	4162.58	665.55
PA- W05	37	35.02	115	7.83	4161.05	665.07
PA- W06	37	35.17	115	6.03	4161.38	667.72
PA- W07	37	34.06	115	8.97	4159.26	663.43
PA- W08	37	36.49	115	4.05	4163.89	670.57
PA- W09	37	36.60	115	1.71	4164.18	674.02
PA- W10	37	36.52	115	1.66	4164.03	674.10
PA- W11	37	31.69	115	8.82	4154.87	663.73
PA- W12	37	30.83	115	8.76	4153.28	663.85

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GEODETIC AND UTM COORDINATES OF ACTIVITY LOCATIONS PAHROC VALLEY, NEVADA

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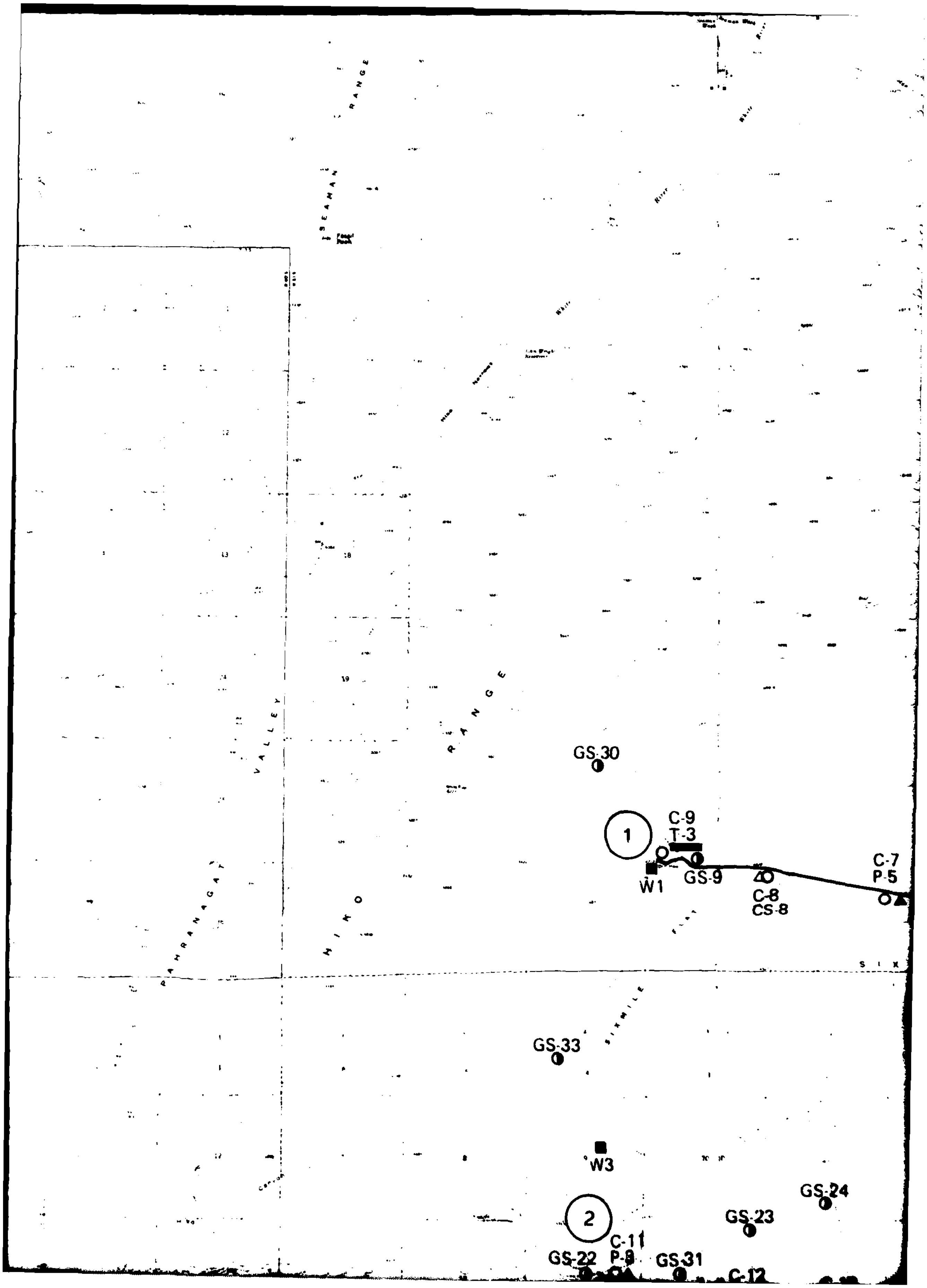
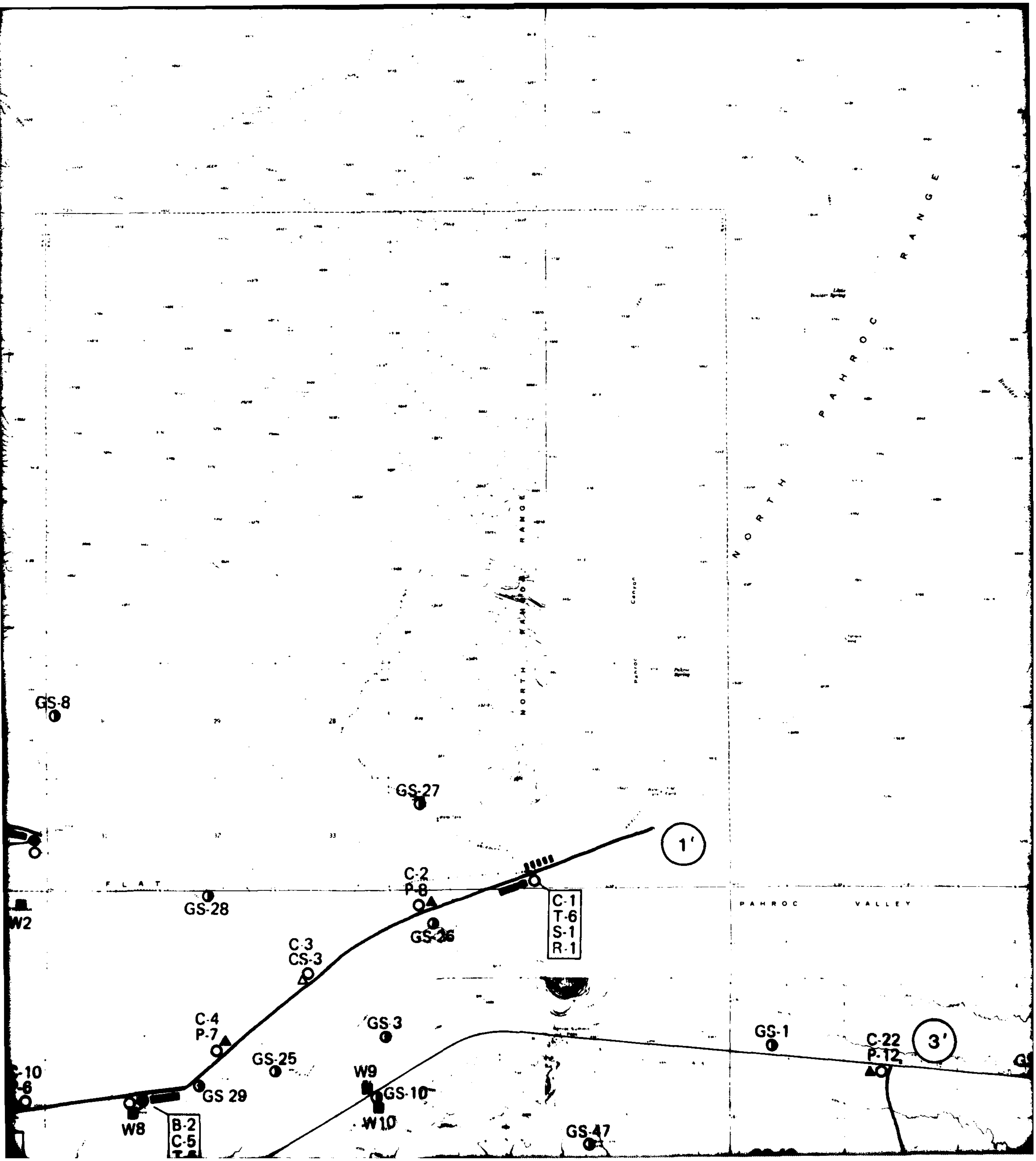
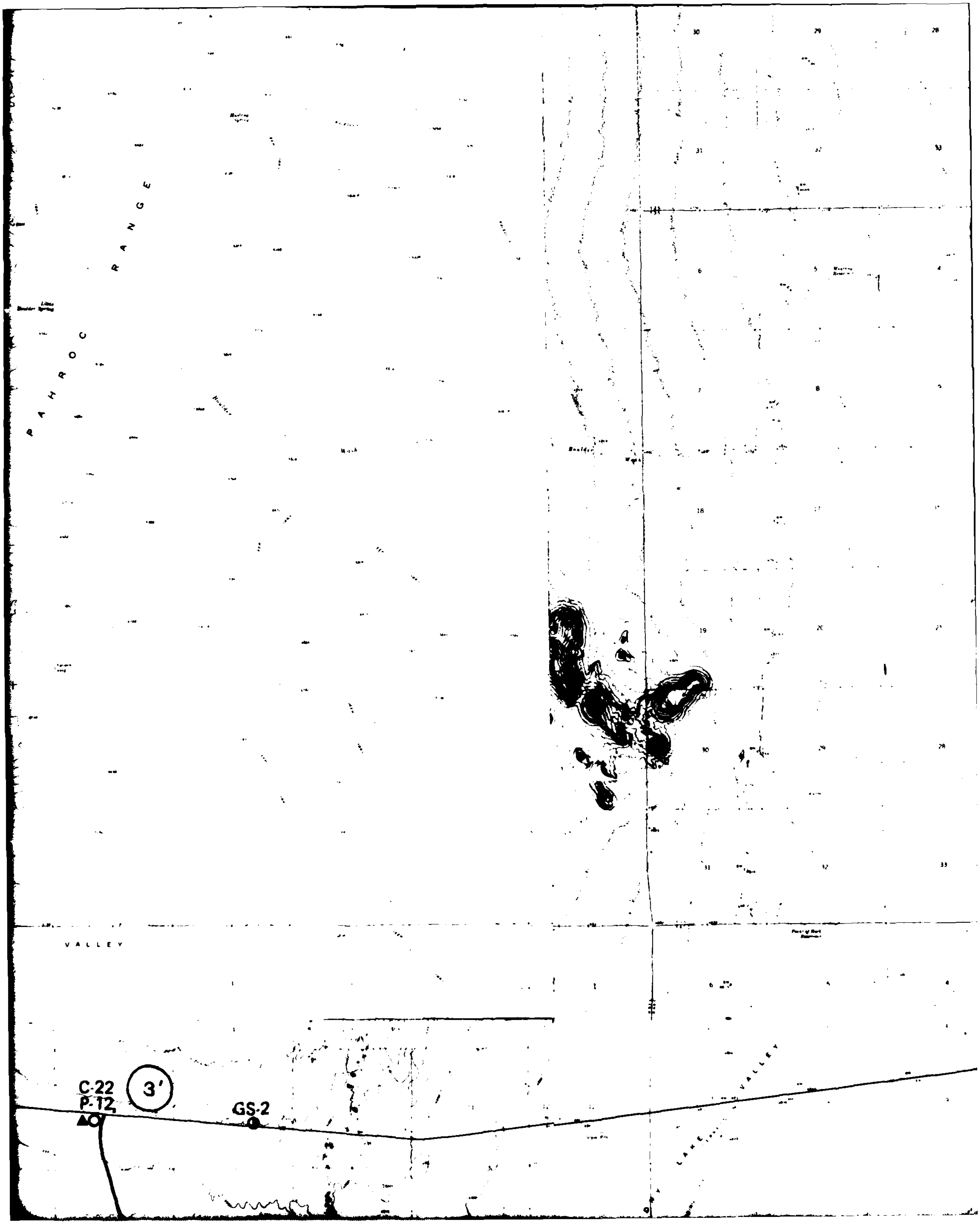
30 JUN 81 TABLE II-1-1


SEAMAN
RANGE
VALLEY
PAHRANAGAT
RANGE
HIKO
FLAT
SIX
SIXMILE
GS-30
1
C-9
T-3
W1
GS-9
C-7
P-5
C-8
CS-8
GS-33
W3
GS-24
2
GS-23
C-11
GS-22
P-8
GS-31
C-12

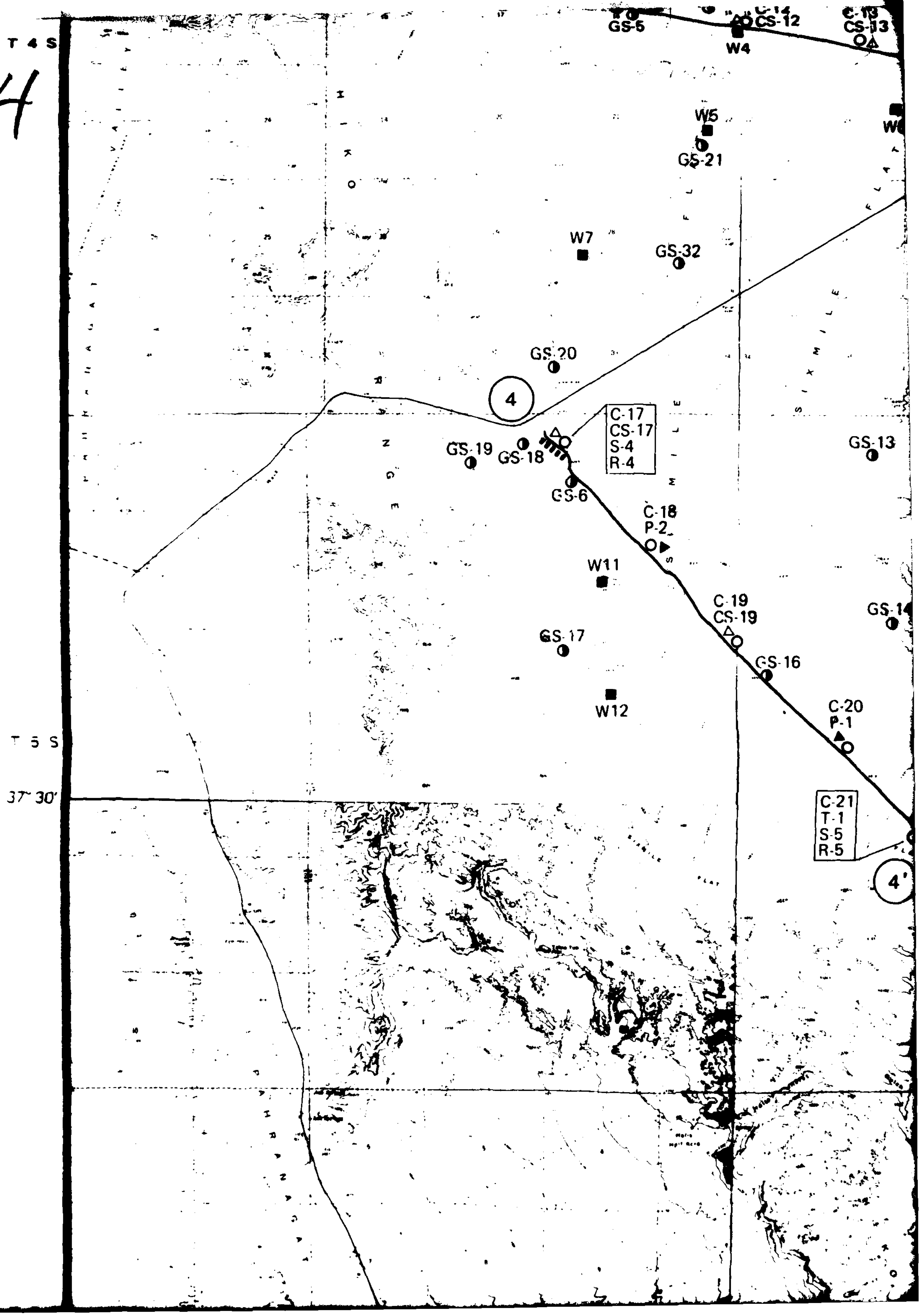


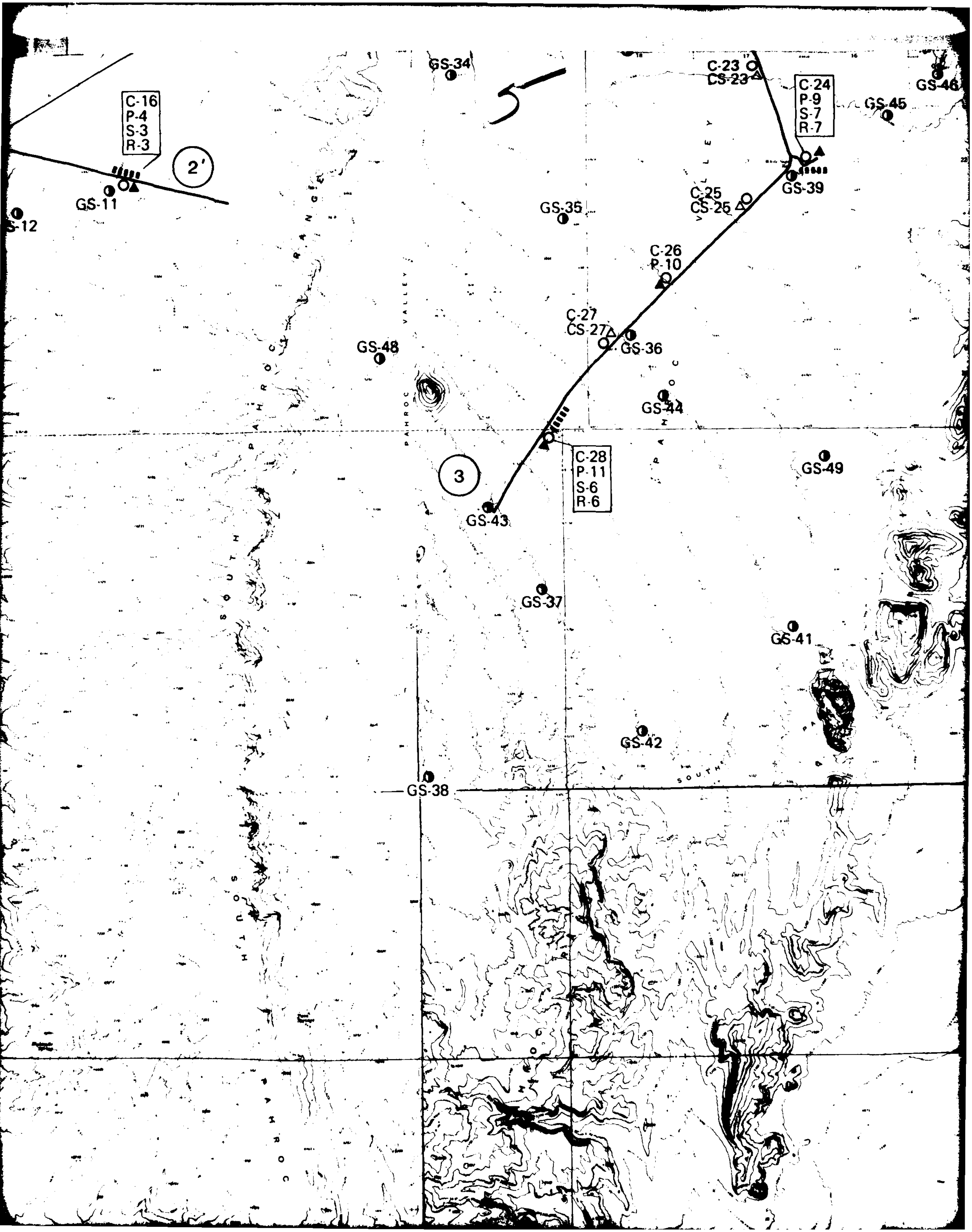
NORTH PAHROC RANGE
NORTH PAHROC RANGE
PAHROC VALLEY
FLAT
GS-8
GS-27
GS-28
W2
C-2
P-8
C-1
T-6
S-1
R-1
1'
GS-26
C-3
CS-3
C-4
P-7
GS-3
GS-25
GS 29
W8
B-2
C-5
W9
GS-10
W10
GS-47
GS-1
C-22
P-12
3'



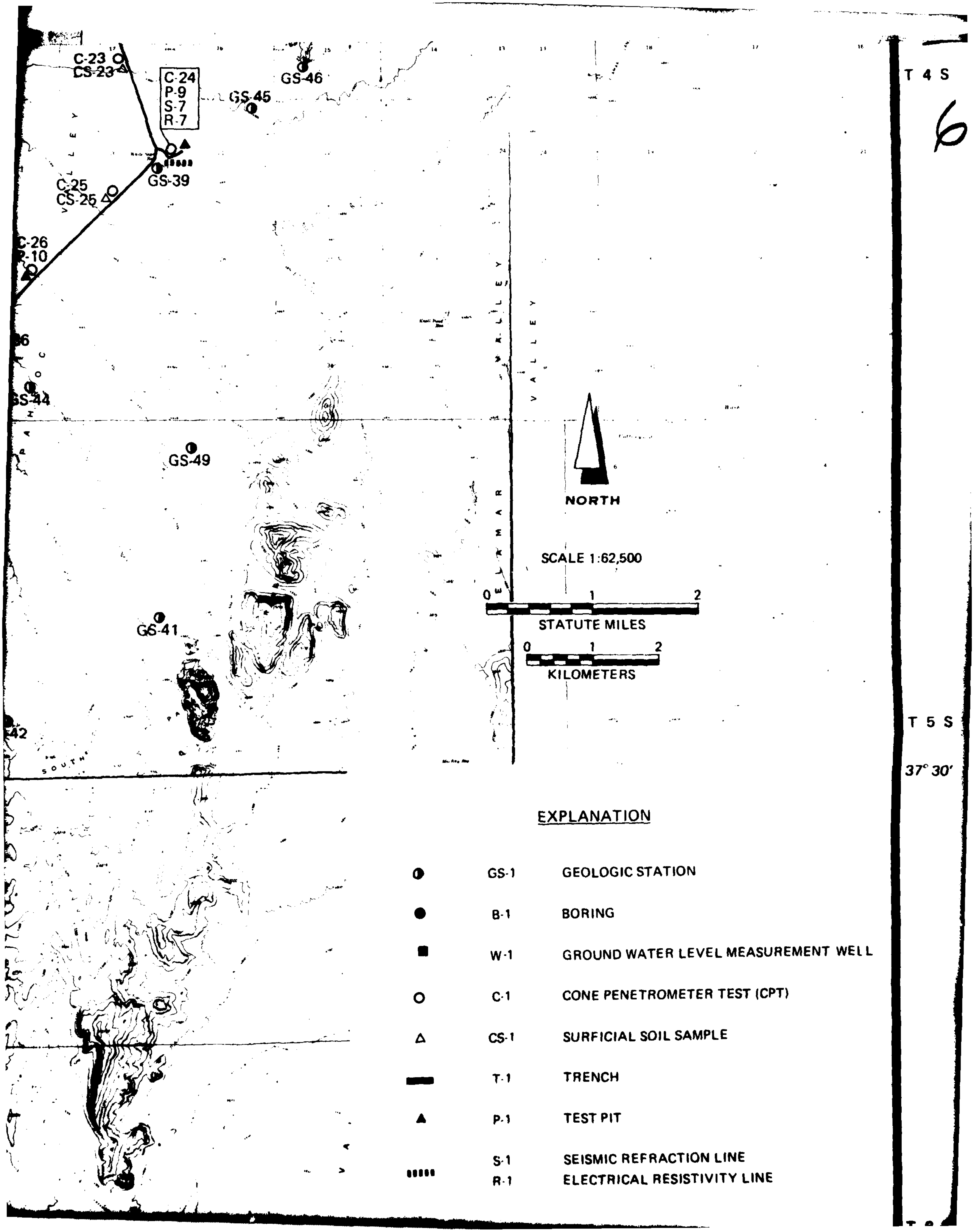
PAHROC RANGE
VALLEY
LAKE VALLEY
C-22
P-12
3'
GS-2
30
29
28
31
33
6
5
4
7
8
18
19
20
30
29
28
31
33

4

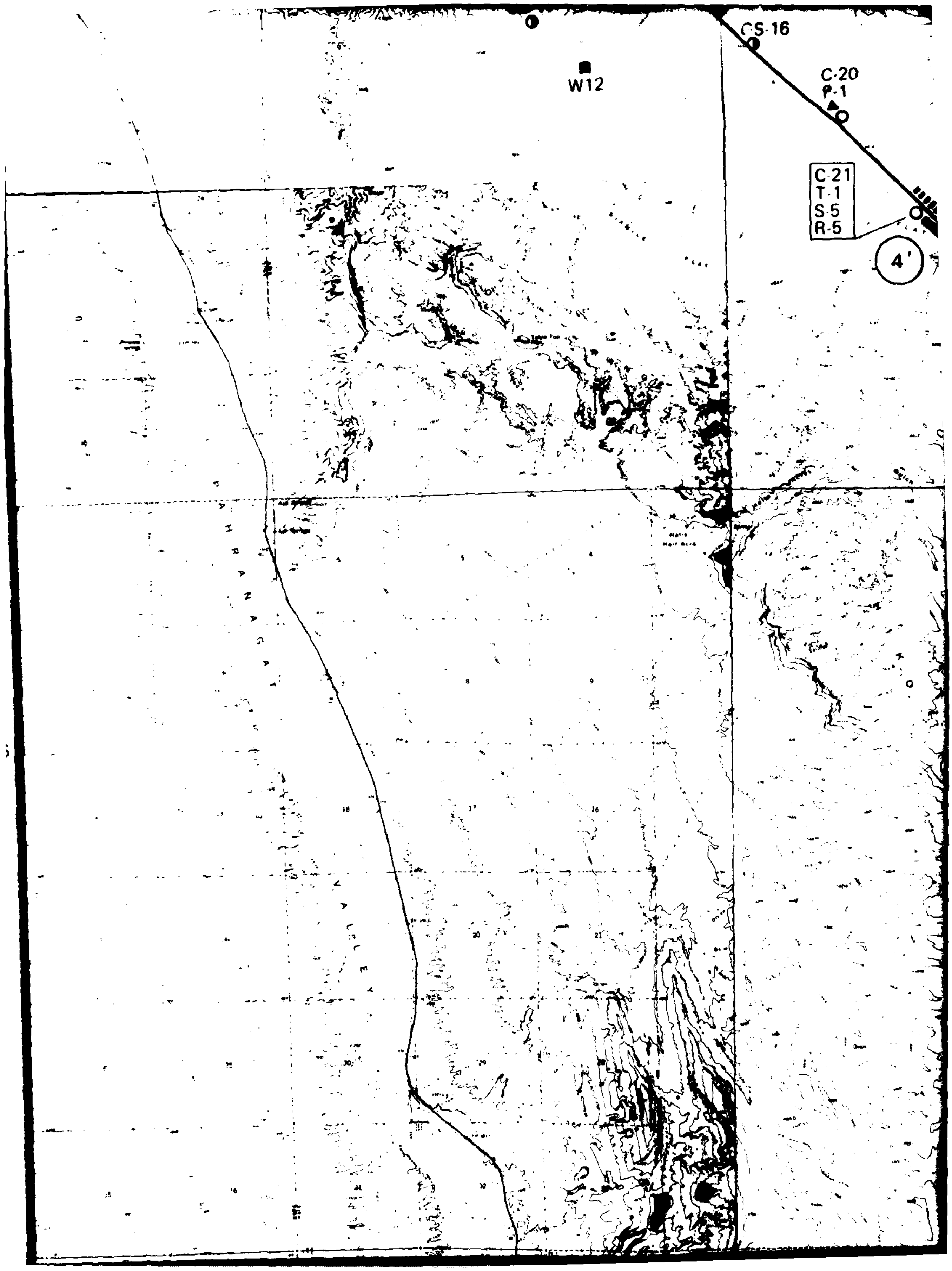

T 4 S
T 5 S
37° 30'
GS-5
C-12
CS-12
W4
C-13
CS-13
W5
GS-21
W7
GS-32
GS-20
4
C-17
CS-17
S-4
R-4
GS-19
GS-18
GS-6
GS-13
C-18
P-2
W11
C-19
CS-19
GS-17
GS-16
W12
C-20
P-1
C-21
T-1
S-5
R-5
4'



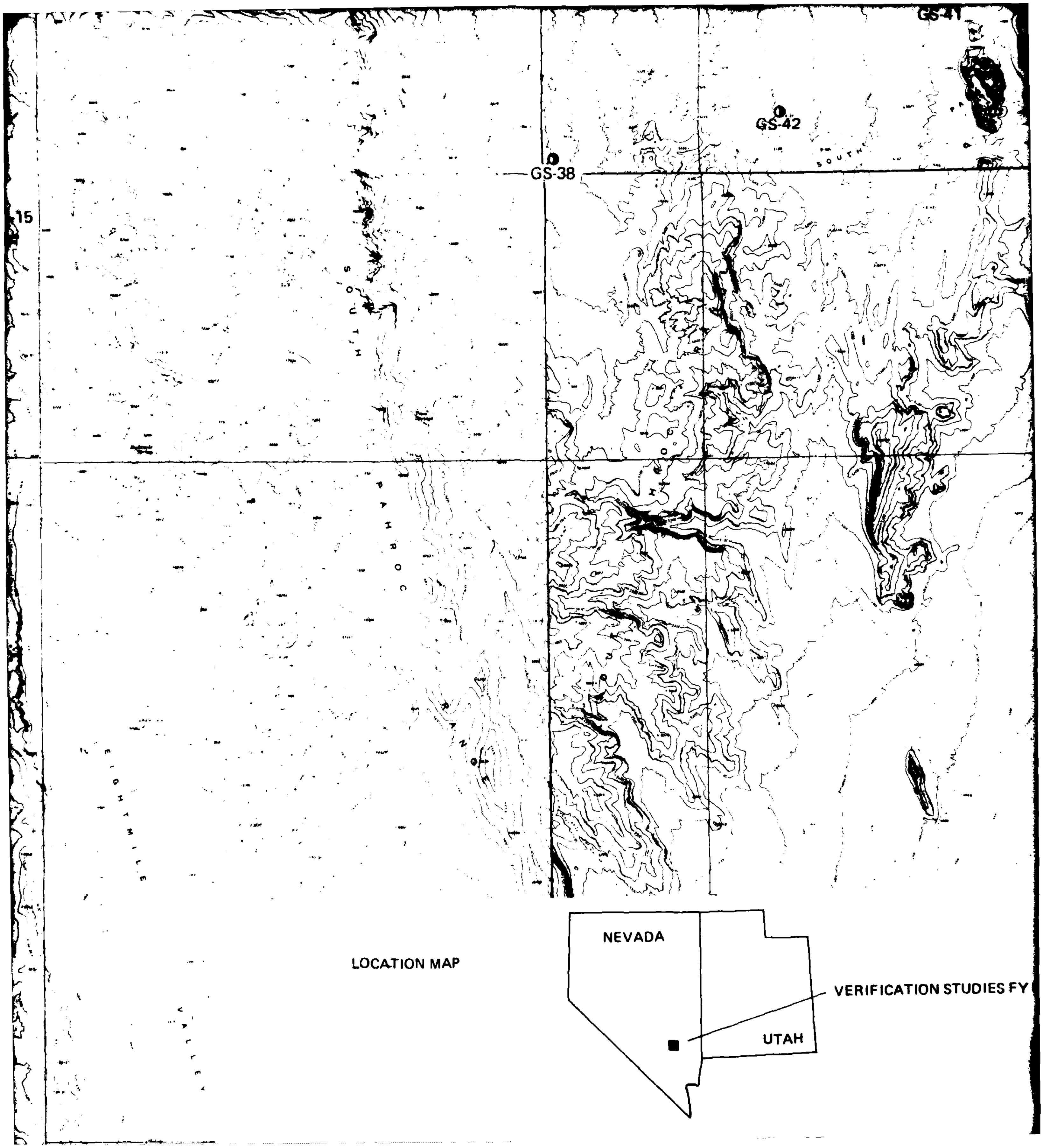
GS-34
5
C-23
CS-23
C-24
P-9
S-7
R-7
GS-46
GS-45
C-16
P-4
S-3
R-3
2'
GS-11
S-12
GS-39
C-25
CS-25
GS-35
C-26
P-10
C-27
CS-27
GS-36
GS-48
GS-44
C-28
P-11
S-6
R-6
GS-49
3
GS-43
GS-37
GS-41
GS-42
GS-38
SOUTH
PAHROC
PAHROC VALLEY



C-23
CS-23
C-24
P-9
S-7
R-7
GS-45
GS-46
GS-39
C-25
CS-25
C-26
R-10
GS-44
GS-49
GS-41
T 4 S
6
T 5 S
37° 30′
NORTH
SCALE 1:62,500
0 1 2
STATUTE MILES
0 1 2
KILOMETERS
VALLEY
EXPLANATION
GS-1 GEOLOGIC STATION
B-1 BORING
W-1 GROUND WATER LEVEL MEASUREMENT WELL
C-1 CONE PENETROMETER TEST (CPT)
CS-1 SURFICIAL SOIL SAMPLE
T-1 TRENCH
P-1 TEST PIT
S-1 SEISMIC REFRACTION LINE
R-1 ELECTRICAL RESISTIVITY LINE



CS-16
W12
C-20
P-1
C-21
T-1
S-5
R-5
4'



GS-41
GS-42
GS-38
SOUTH
15
SOUTH
PAHROC
RANGE
EIGHTMILE
VALLEY
LOCATION MAP
NEVADA
UTAH
VERIFICATION STUDIES FY

STATUTE MILES

0 1 2

KILOMETERS

EXPLANATION

Symbol	Label	Description
◐	GS-1	GEOLOGIC STATION
●	B-1	BORING
■	W-1	GROUND WATER LEVEL MEASUREMENT WELL
○	C-1	CONE PENETROMETER TEST (CPT)
△	CS-1	SURFICIAL SOIL SAMPLE
▬	T-1	TRENCH
▲	P-1	TEST PIT
▮▮▮▮▮	S-1 R-1	SEISMIC REFRACTION LINE ELECTRICAL RESISTIVITY LINE
(1)═(1')		ACTIVITY LINE

NOTE: Due to the exaggeration of the map symbols, the exact location of any combination of activities is where either the boring (1st) or the CPT (2nd) is situated. Single activities are most securely located nearest the center of the symbol.

VERIFICATION STUDIES FY 80

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ACTIVITY LOCATION MAP
PAHROC VALLEY, NEVADA

30 JUN 81

DRAWING II-1-1

2.0 GEOLOGIC STATION DATA

Explanation: Geologic stations were established at selected locations throughout the valley at which detailed descriptions of surficial basin-fill deposits or rock were recorded. An example of the field data sheet is shown in Figure II-2-1. All data taken on surficial basin-fill units at the geologic stations are listed in Table II-2-2, and an explanation of the column headings in the table is given below. At stations where rock descriptions were made, only geologic unit designations are listed. A general explanation of all geologic unit symbols used in Verification studies is included at the end of this section.

Column Heading Table II-2-2	Explanation
Station Number	Geologic stations are numbered sequentially. (e.g., NPAG001; N= Nevada-Utah Study Area; PA= Valley abbreviation [Pahroc]; G= Geology Station).
Geol. Unit	Generalized mapped geomorphic unit (see explanation below). The grain-size designations (s, g, and f) indicate sand, gravel, and fines, respectively.
MPS (mm)	Average Maximum Particle Size in millimeters.
Grain Size (%B, %C, %G, %S, %F)	Estimated particle size distribution using the Unified Soil Classification System. Percentages of boulders (%B) and cobbles (%C) are based on the entire deposit, whereas percentages of gravel (%G), sand (%S), and fines (%F) are taken only on the fraction composed of particles less than 3 inches (76 mm) in diameter. Note: The symbol Ø (occasional) indicates between 1 and 5 percent; zero indicates 0 to 1 percent.

*	Laboratory analyses of selected soil samples using the Unified Soil Classification System.
USCS	Soil class according to the Unified Soil Classification System.
Munsell Color	Soil color based on standard Munsell Soil Color Charts.
Source Rock Types	Rock types of coarse clasts (gravel) listed in order of abundance.
Physical Properties	Data listed in columns 6 through 15 address specific soil properties. These are listed below in parentheses following the column heading number and are also listed at the bottom of Table II-2-1. Data are coded with each numerical entry referring to a specific soil condition as listed below.

6	(Grain Shape)	1) Angular, 2) Subangular, 3) Subrounded, 4) Rounded, 5) Well rounded
7	(Moisture Content)	1) Dry, 2) Slightly Moist, 3) Moist, 4) Very Moist, 5) Wet
8	(Plasticity of Fines)	1) None, 2) Low, 3) Medium, 4) High
9	(Consistency)	Coarse-grained: 1) Very Loose, 2) Loose, 3) Medium Dense, 4) Dense, 5) Very Dense Fine-grained: 1)Soft, 2) Firm, 3) Stiff, 4) Hard
10	(Structure)	1) Non-stratified, 2) Stratified, tabular, 3) Stratified, other (lensed, cross bedded, discontinuous beds)
11	(Cementation-Induration)	1) None, 2) Weak, 3) Moderate, 4) Strong
12	(Depth to Cemented Layer)	Depth to layer (in centimeters) exhibiting cementation-induration described in Column 11 (above)
13	(Weathering of clasts)	1) Fresh, 2) Slight, 3) Moderate, 4) Very

14 (Soil Profile Development)	1) None (A-C profile), 2) Poor (incipient B-horizon), 3) Well (prominant B-horizon)
15 (Caliche Development)	1) None, 2) Stage I, 3) Stage II, 4) Stage III, 5) Stage IV
Terrain	Terrain information at the data location is broken into the following categories:
Drainage Depth (ft)	Average depth of drainages (in feet)
Drainage Width (ft)	Average width of drainages (in feet)
Slope (%)	Average slope of ground surface (in percent grade)
Sample	Number of samples taken

GENERALIZED GEOLOGIC UNITS

Explanation

Surficial Basin-fill Units

A1 Younger Fluvial Deposits - Major recent stream channel and floodplain deposits.

A2 Older Fluvial Deposits - Older incised stream channel and floodplain deposits in elevated terraces bordering major recent drainages. Note: Not mapped in Delamar Valley.

A3 Eolian Deposits - Windblown deposits of sand occurring as either thin sheets (A3s) or dunes (A3d).

A4 Playa and Lacustrine Deposits - Deposits occurring in modern, active playas (A4) or in either inactive playas or older lake beds and abandoned shorelines associated with extinct lakes (A4o).

A5 Alluvial Fan Deposits - Alluvial deposits consisting of debris flow and water-laid alluvium near mountain fronts, grading into predominantly water-laid alluvium deposited in shifting distributary channels near the basin center. Younger (A5y), intermediate (A5i), and older (A5o) alluvial fans are differentiated by surface soil development, terrain conditions, and present depositional/erosional environment.

Grain sizes of these deposits (except A3 deposits, which are exclusively sandy) are indicated by a single letter (f, s, or g) following the geologic unit symbol. These letters indicate the predominant grain size and range of soil types according to the Unified Soil Classification System.

f - fine-grained clays and silts (ML, CL, MH, CH)

s - sands (SP, SW, SM, SC)

g - gravels (GP, GW, GM, GC)

ROCK UNITS

I Igneous (undifferentiated). Rocks formed by solidification of a molten or partially molten mass.

I1 Intrusive - Plutonic rocks formed by solidification of molten material beneath the surface (e.g., granite, granodiorite, diorite, gabbro).

I2 Extrusive (intermediate and acidic) - Volcanic rocks of intermediate and acidic compositon formed by solidification of molten material at or near the surface, (e.g., rhyolite, latite, dacite, andesite).

I3 Extrusive (basic) - Volcanic rocks of basic composition, generally formed by solidification of molten materials at or near the surface (e.g., basalt).

I4 Extrusive (pyroclastic) - Rocks formed by accumulation of volcanic ejecta (e.g., ash, tuff, welded tuff, agglomerate).

S Sedimentary (undifferentiated) - Rocks formed by accumulation of clastic solids, organic solids, and/or chemically precipitated minerals.

S1 Arenaceous and/or Siliceous Rocks - Composed of sand-size particles (e.g., sandstone, orthoquartzite) or of cryptocrystalline silica (e.g., opal, chert).

S2 Carbonate Rocks - Composed predominantly of calcium carbonate detritus or chemical precipitates (e.g., limestone, dolomite, chalk).

S3 Argillaceous Rocks - Composed of clay and silt-sized particles (e.g., siltstone, shale, claystone).

S4 Evaporite Rocks - Precipitated from solution as a result of evaporation (e.g., halite, gypsum, anhydrite, sylvite).

S5 Coarse Clastic Rocks - Composed of gravel sized or larger clasts (e.g., conglomerate, breccia).

M Metamorphic (undifferentiated) - Rocks formed through recrystallization in the solid state of preexisting rocks by heat and pressure (e.g., gneiss, schist, hornfels, metaquartzite).

Station No. CSS VALLEY CLM STATION # 1 2 3 4 5 6 7 | Described Geol. Unit UNIT AGE 8 9 10 11

Date ______________ | Complete Geol. Unit ______________

Observers ______________ | Field Photo Nos. ______________

Air Photo No. ______________ | Sample (No=0, Yes=1) 12 ______________

SOIL PROPERTIES

1. Grain-Size Distribution: MPS (mm) - grain size of coarsest fraction; boulders and cobbles - percent of total; gravel, sand, and fines - percent less than 3 inches.

2. USCS Symbol

3. Descriptive Name (one adjective only) ______________

4. Munsell Color (not applicable to gravel)

5. Lithology of gravel, cobbles, boulders: give rock type (I1, I2, M, etc.) in order of abundance.

6. Grain Shape (coarse grained soil only): 1) Angular, 2) Subangular, 3) Subrounded, 4) Rounded, 5) Well-rounded.

7. Moisture Content: 1) Dry, 2) Slightly moist, 3) Moist, 4) Very moist, 5) Wet

8. Plasticity of Fines: 1) None, 2) Low, 3) Medium, 4) High

9. Consistency:
   Coarse-grained: 1) Very Loose, 2) Loose, 3) Medium Dense, 4) Dense, 5) Very Dense
   Fine-grained: 6) Soft, 7) Firm, 8) Stiff, 9) Hard

10. Structure: 1) Non-stratified (homogeneous), 2) Stratified-tabular, 3) Stratified-other; if 3) describe ______________

11. Cementation-Induration: 1) None, 2) Weak, 3) Moderate, 4) Strong

12. Depth to Cemented Layer (cm)

13. Weathering of boulders, cobbles, and gravel: 1) Fresh, 2) Slight, 3) Moderate, 4) Very

14. Degree of Soil Profile Development: 1) None (A-C profile), 2) Poor (incipient B-horizon), 3) Well (prominant B-horizon)
   Describe ______________

15. Degree of Caliche Development: 1) None, 2) Stage I, 3) Stage II, 4) Stage III, 5) Stage IV
   Describe ______________

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FIELD DATA SHEET
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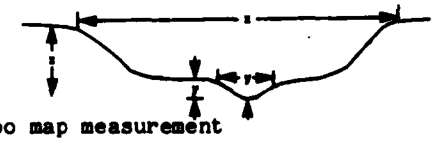
FIGURE II-2-1

TERRAIN

16. Average Drainage Depth (ft)



17. Average Drainage Width (ft)

18. Slope (percent) - field and/or topo map measurement

FIELD MAP

SURFACE FEATURES

19. Pit Depth (cm) ______

20. Thickness of Vesicular Silt (cm) ______

21. Desert Pavement Development
    (None, Poor, Moderate, Well) ______

22. Patina Development
    (None, Moderate, Well) ______

COMMENTS

______

______

______

______

ROCK DESCRIPTIONS

23. Rock Type/Formation ______

24. Color, Grain size, Hardness, Texture ______

______

25. Degree of Weathering ______

26. Structure
    Bedding Characteristics ______

    Bedding Attitude ______

    Fracture, Joint ______

27. Secondary Alteration/Mineralization ______

______

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FIGURE II-2-1

STATION NUMBER	GEOL UNIT	MPS MM	XB	XC	XG	XS	XF		USCS	MUNSELL COLOR	SOURCE ROCK TYPES	6	7	8	9	10	11	12	13	14	15	DRAINAGE (FT) DEPTH	DRAINAGE (FT) WIDTH	SLOPE (%)	SAMPLE
PAGS001	A5YS	30	0	0	1	89	10		SP-SM	7.5YR5/4	I2	2	3	2	2	1	1		2	1	1			2	1
PAGS002	A5IS	160	0	0	3	92	5		SP-SM	7.5YR4/4	I2	2	3	1	2	1	2	63	2	2	4	1.0	3.0	2	0
PAGS003	A5IS	25	0	0	2	93	5		SP-SM	7.5YR4/4	I2	2	3	1	3	1	2	30	2	1	4			3	1
PAGS004	A5YS	20	0	0	0	97	3		SP	7.5YR5/4		2	3	1	2	1	2	76	2	1	2	0.0	3.0	2	0
PAGS005	A5YS	85	0	0	30	67	3		SP	10.0YR4/3	S2	2	3		1	2	1		2	2	2	1.0	7.0	2	0
PAGS006	A5YS	50	0	0	1	75	4		SP	10.0YR4/4	I2	2	3	1	2	1	2	48	3	2	2	0.0	0.0	3	1
PAGS007	A5YS	60	0	0	3	92	5		SP-SM	7.5YR4/4	I2	2	3	1	2	1	2	21	3	3	4	2.0	3.0	3	0
PAGS008	A5IS	200	0	15	10	86	4		SP	7.5YR4/4	I2 S2	2	3	1	2	1	2	40	3	2	4	2.0	13.0	2	1
PAGS009	A5IS	70	0	0	25	60	15		SM	10.0YR5/4	S2 I2	2	3	2	3	2	3	30	2	2	4	3.0	16.0	3	0
PAGS010	A5YS	24	0	0	3	87	10	*	SP-SM	10.0YR3/4	I4	2	1	1	2	3	1		2	1	1			3	1
PAGS011	I4																								1
PAGS012	A5IS	18	0	0	4	81	15	*	SM	10.0YR4/4		2	1	2	2	1	3	25	2	1	4	5.0	165.0	5	1
PAGS013	A5YS	25	0	0	4	81	15	*	SM	10.0YR4/4		2	1	1	2	1	2	34	2	1	4	5.0	80.0	3	1
PAGS014	A2 S	434	5	10	20	75	5		SP-SM		I4	2	1	1		3			2	1	1	33.0	310.0		0
PAGS015	I4																								1
PAGS016	A5YS	10	0	0	0	90	10		SP-SM	10.0YR3/6		2	1	1	2	1	1		2	1	1			4	0
PAGS017	A5IS	210	0	0	40	25	35		SM		S2	3	1	3	3	1	2	10	2	1	3	3.0	7.0	6	0
PAGS018	A5YS	33	0	0	0	95	5		SP-SM	10.0YR4/4		2	1	1	3	1	3	45	2	1	4	23.0	50.0	5	1
PAGS019	S2																								1
PAGS020	A5IS	50	0	0	5	80	15		SM	10.0YR5/4	I4	2	1	1	4	1	3	10	2	1	4	5.0	330.0	5	0
PAGS021	A5YS	10	0	0	1	87	12	*	SP-SM	10.0YR3/4		2	1	1	3	1	3	30	2	2	3			2	1
PAGS022	S2																								1
PAGS023	A1 S	180	0	0	35	65	0		SP	10.0YR3/3	S2 I4	2	1	1	3	2	1		2	1	2	3.0	50.0	1	1
PAGS024	A5IS	40	0	0	5	75	20	*	SM	10.0YR3/4	I4 S2	2	3	1	3	1	2	43	2	1	3			2	0
PAGS025	A5YS	80	0	0	15	73	12	*	SP-SM	10.0YR4/4	I4	2	1	1	3	1	3	38	2	2	2	0.0	3.0	3	1
PAGS026	I4																								1
PAGS027	A5IS	95	0	5	30	45	25	*	SM	10.0YR6/4	S1 S2	2	1	2	3	1	3	27	2	1	4	5.0	20.0	4	1
PAGS028	A5IS	100	0	5	35	55	10	*	SP-SM	10.0YR4/3	S2 I4 I3 S1	2	1	1	3	1	1		2	1	2	1.0	3.0	2	1
PAGS029	A5YS	25	0	0	0	97	3		SP	10.0YR4/4		2	1	1	2	1	2	42	2	1	2			3	0
PAGS030	A5IS	95	0	0	10	80	10		SP-SM	10.0YR5/4	S2 I2	2	1	1	2	1	3	56	2	1	3	5.0	25.0	5	0
PAGS031	A5IS	55	0	0	10	75	15		SM	10.0YR4/4	I4 S2 S1	2	1	1	2	1	1		2	1	3	3.0	30.0	1	0
PAGS032	A5YS	8	0	0	0	95	5		SP-SM	10.0YR4/4		3	1	1	3	1	2	45	2	1	4			4	0
PAGS033	A5OG	400	0	5	62	32	1		GP		S2 S1	2	1	1	2	1	2	0	2	1	2	20.0	250.0	4	0
PAGS034	A5YS	50	0	0	5	90	5		SP-SM	7.5YR4/4	I2	2	3	1	3	1	2	34	2	1	2			2	1
PAGS035	A5IS	75	0	0	3	87	10		SP-SC	7.5YR4/4	I2	2	3	2	3	1	2	28	2	2	2			1	1
PAGS036	A5YS	4	0	0	0	90	10		SP-SM	10.0YR4/4	I2	2	3	2	2	1	1		2	1	2			1	0
PAGS037	A5IS	75	0	0	10	85	5		SP-SM	7.5YR4/4	I2	2	3	2	2	1	3	28	3	2	4	3.0	30.0	3	0
PAGS038	A5IS	70	0	0	5	80	15		SC	10.0YR4/6	I2	2	3	3	3	1	3	44	3	3	4	2.0	7.0	4	1
PAGS039	A1 S	3	0	0	0	75	25		SM	10.0YR4/4		2	3	2	3	3	1			1	2				1
PAGS040	A5YS	15	0	0	0	70	30		SM	10.0YR4/4		2	1	2	3	1	1		2	1	2	2.0	3.0	1	1
PAGS041	A5IS	50	0	0	5	55	40		SM	10.0YR4/4	I2	2	1	3	4	1	3	38	2	2	3	5.0	13.0	4	0
PAGS042	A5IS	80	0	0	0	80	20		SM	10.0YR5/4	I2	2	1	2	2	1	3	17	2	1	5	1.0	15.0	3	1
PAGS043	I4																								1
PAGS044	A5YS	3	0	0	0	80	20		SM	10.0YR5/4		2	1	2	3	1	1		2	1	2	2.0	7.0	2	0
PAGS045	A5IS	3	0	0	0	65	35		SM			2	1	1	3	1	1		2	1	2	2.0		3	1
PAGS046	I4																								1
PAGS047	A5IS	7	0	0	0	85	15		SP	10.0YR4/4		2	1	1	2	1	3	20	2	2	5	2.0	3.0	2	0
PAGS048	A5YS	20	0	0	0	70	10		SP-SM	10.0YR3/4		2	1	1	3	1	1		2	2	1	2.0	3.0	3	0
PAGS049	A5IS	80	0	0	0	100	0		SP	10.0YR3/6	I2	2	1	1	3	1	4	30	2	2	5	7.0	10.0	4	0

EXPLANATION: PHYSICAL PROPERTIES

6: GRAIN SHAPE	9: CONSISTENCY	12: DEPTH TO CEMENTED LAYER (CM)	15: CALICHE DEVELOPMENT
7: MOISTURE CONTENT	10: STRUCTURE	13: WEATHERING OF CLASTS	NOTE: 0=OCCASIONAL (1-5%)
8: PLASTICITY OF FINES	11: CEMENTATION-INDURATION	14: SOIL PROFILE DEVELOPMENT	NOTE: *=LAB DATA

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GEOLOGIC STATION DATA
PAHROC VALLEY, NEVADA

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TABLE II-2-1

3.0 GROUND-WATER DATA

Explanation: Existing ground-water data in Pahroc Valley were collected from all available sources. These data were updated where possible from measurements taken during Ertec field operations, and all data are shown in Table II-3-1. Locations of water wells and boreholes in which water-level measurements were available are shown in Drawing II-1-1. Well numbers listed in the left hand column of Table II-3-1 refer to well locations shown in Drawing II-1-1. Actual well numbers giving location, according to the Bureau of Land Management Land Survey System, are shown in the second column.

Water levels generally refer to the static ground-water table in the unconfined basin-fill aquifer. Perched conditions or levels in artesian aquifers are noted where known.

WELL NO.	WELL LOCATION NUMBER* (Twp-Rge-Sec)	ELEVATION OF GROUND SURFACE FEET (METERS) ABOVE M.S.L.	DEPTH OF WELL FEET (METERS)	WATER LEVEL			REFERENCES**/ REMARKS
				DEPTH BELOW GROUND SURFACE-FEET (METERS)	DATE MEASURED	ELEVATION—FEET (METERS) ABOVE M.S.L.	
W1	3S/61E-34bb	4713 (1437)	> 500 (152)	dry	6-80	4213 (1284)	2
W2	4S/61E-1aa	4520 (1378)	500 (152)	dry	6-80	< 4020 (1226)	2
W3	4S/61E-9ac	4460 (1372)	300 (92)	dry	10-65	< 4160 (1268)	3
W4	4S/61E-15db	4320 (1317)	—	670 (204)	2-77	3650 (1113)	1, 4
W5	4S/61E-22ca	4300 (1311)	310 (95)	dry	12-63	< 3990 (1216)	3
W6	4S/61E-23ad	4470 (1362)	160 (49)	dry	12-63	< 4310 (1314)	3
W7	4S/61E-28cac	4230 (1290)	1314 (401)	595	12-68	3635 (1108)	3
W8	4S/62E-7dd	4640 (1415)	104 (32)	dry	6-80	< 4536 (1383)	2
W9	4S/62E-9dd1	4900 (1494)	410 (125)	dry	10-65	< 4490 (1369)	3
W10	4S/62E-9dd2	4920 (1500)	240 (73)	dry	10-65	< 4680 (1429)	3
W11	5S/61E-9ca	4410 (1345)	30 (9)	dry	6-80	< 4380 (1336)	2, 3
W12	5S/61E-16bd	4425 (1349)	30 (9)	dry	6-80	< 4395 (1340)	2, 3

*MOUNT DIABLO BASELINE AND MERIDIAN

** REFERENCES:

1. EAKIN, 1963
2. FUGRO NATIONAL MEASUREMENT (1980)
3. NEVADA STATE ENGINEERS WELL LOGS
4. U.S.G.S. WELL INFORMATION PRINTOUT

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GROUND-WATER DATA
PAHROC VALLEY, NEVADA

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TABLE II-3-1

4.0 SEISMIC REFRACTION DATA

Explanation: Each figure shows seismic wave travel times plotted versus surface distance between the energy source (shot) and the detector (geophone) for a single seismic line. Distances are measured along the line from geophone number 1 which is designated as zero distance. Distances to the right (on the paper) of geophone 1 are positive. The direction arrow gives the approximate direction of the geophone array from geophone 1 to geophone 24.

Travel Time Versus Distance Graph (Upper Half of Figure)

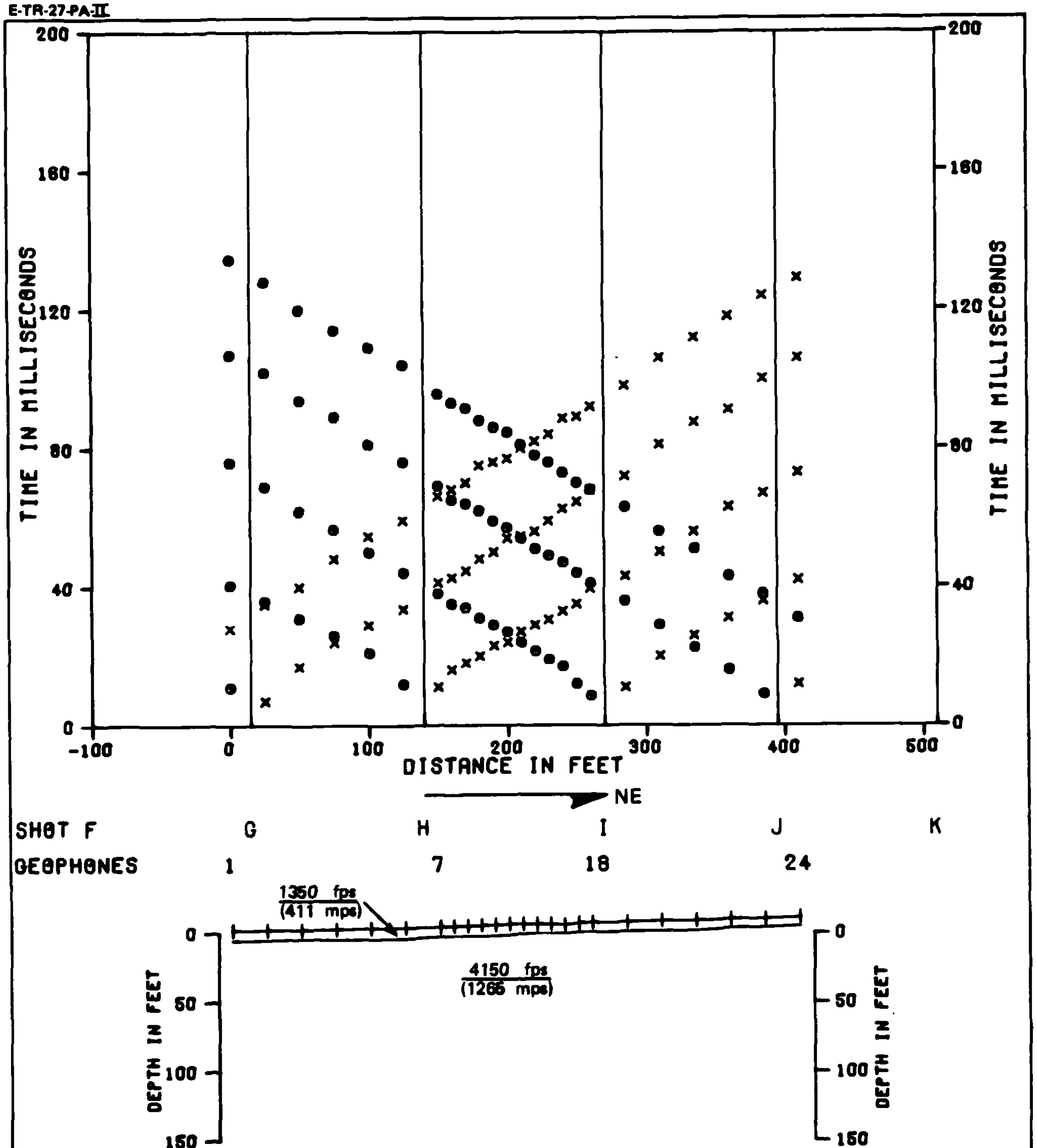
On this graph, the abscissa represents distance; the ordinate, time. The six vertical lines represent the locations of shots (designated as F, G, H, I, J, and K). The symbol "X" denotes travel times at geophones that were located to the right of a shot. The symbol, ⊖, denotes travel times that were located to the left of shots.

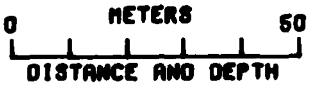
Velocity Cross Section (Lower Half of Figure)

This is an interpreted velocity cross section beneath the seismic line. The top line represents the ground-surface profile. The short vertical lines crossing the top line mark the geophone positions. The depth scale is plotted relative to a point on the line which was arbitrarily chosen as "zero elevation" at the time the line was surveyed. The additional lines across the cross section represent the interpreted boundaries between layers of material with different compressional wave velocities. These boundaries are commonly called "refractors."

The velocity interpreted to be representative of each layer is shown.

E-TR-27-PA-II





× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

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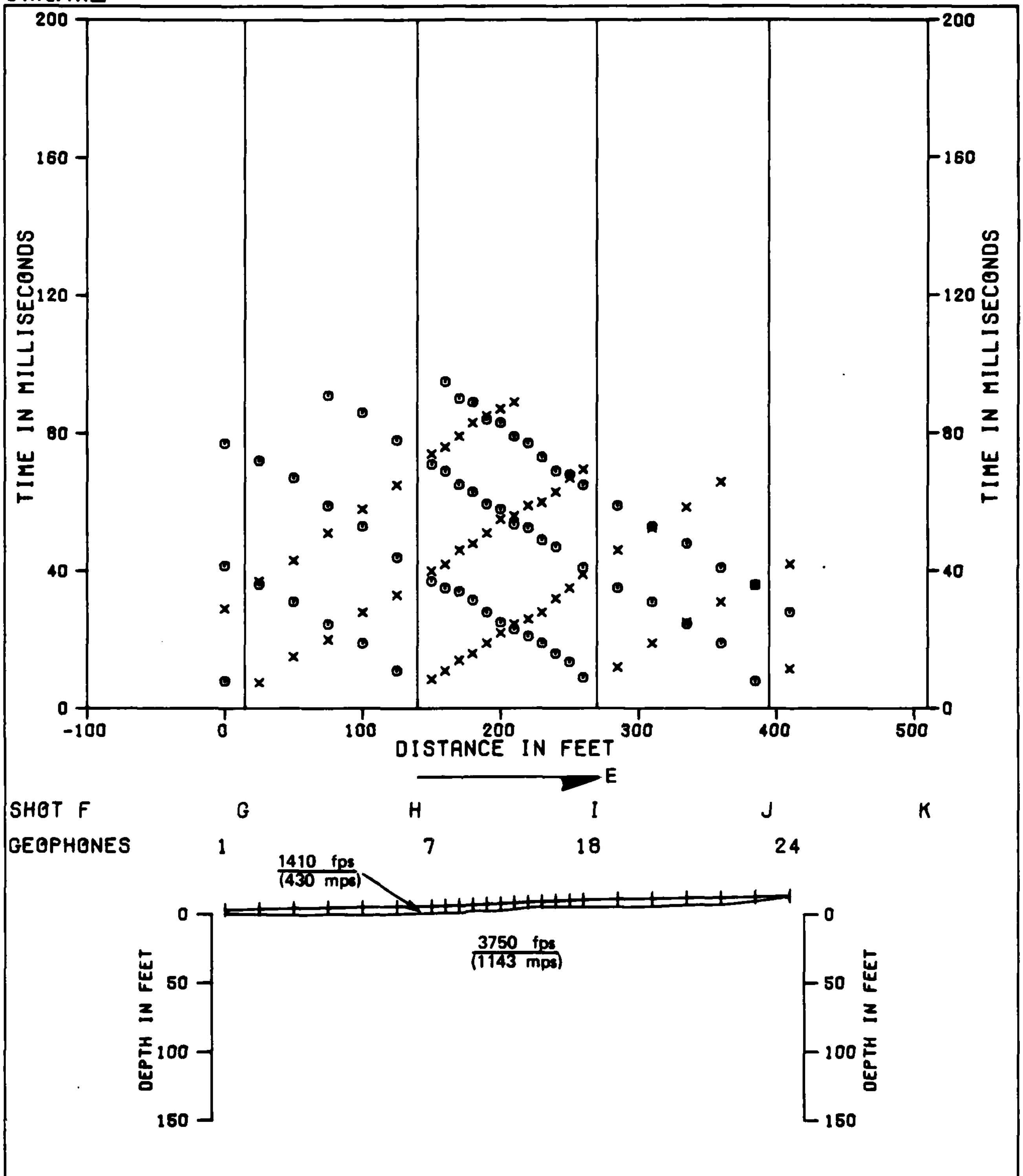
SEISMIC REFRACTION LINE PA-S-1
TIME DISTANCE DATA AND VELOCITY PROFILE
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE III-4-1

E-TR-27-PA-II



0 METERS 50

DISTANCE AND DEPTH

× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

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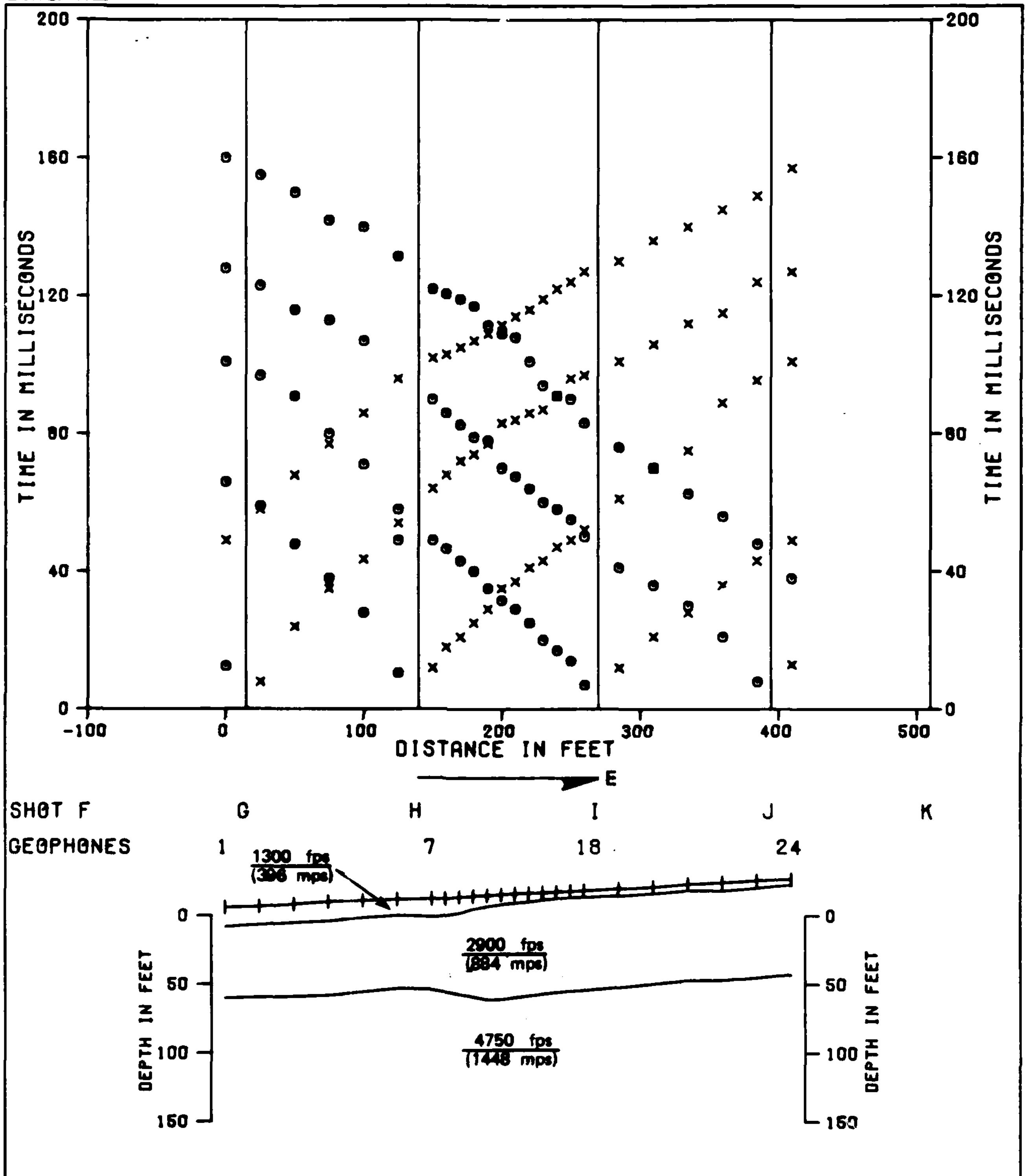
SEISMIC REFRACTION LINE PA-S-2
TIME DISTANCE DATA AND VELOCITY PROFILE
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-4-2

E-TR-27-PA-II



METERS
0 50
DISTANCE AND DEPTH

× TIMES TO RIGHT OF SHOTS
⊙ TIMES TO LEFT OF SHOTS

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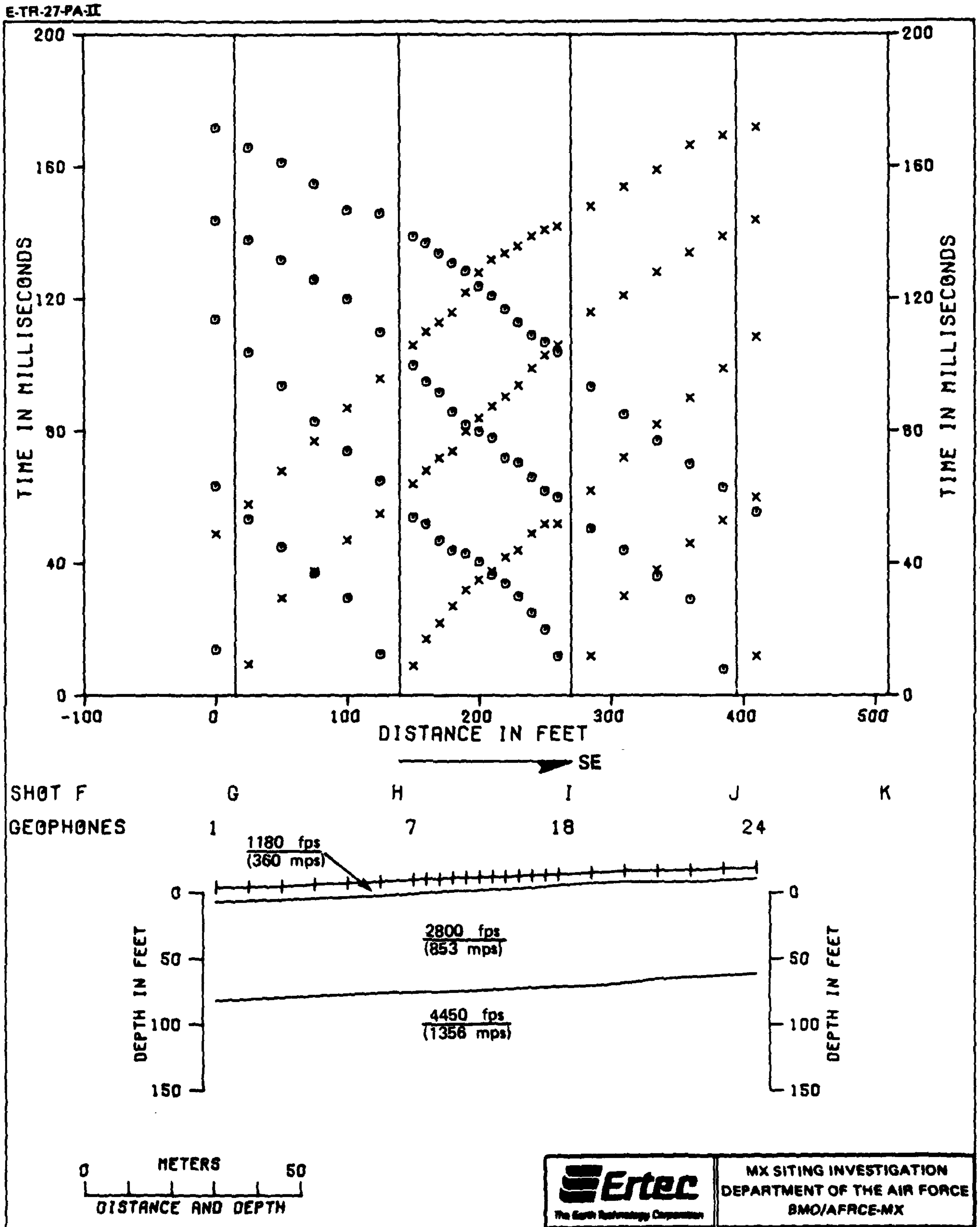
BMO/AFRCE-MX

SEISMIC REFRACTION LINE PA-S-3
TIME DISTANCE DATA AND VELOCITY PROFILE
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-4-3



× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

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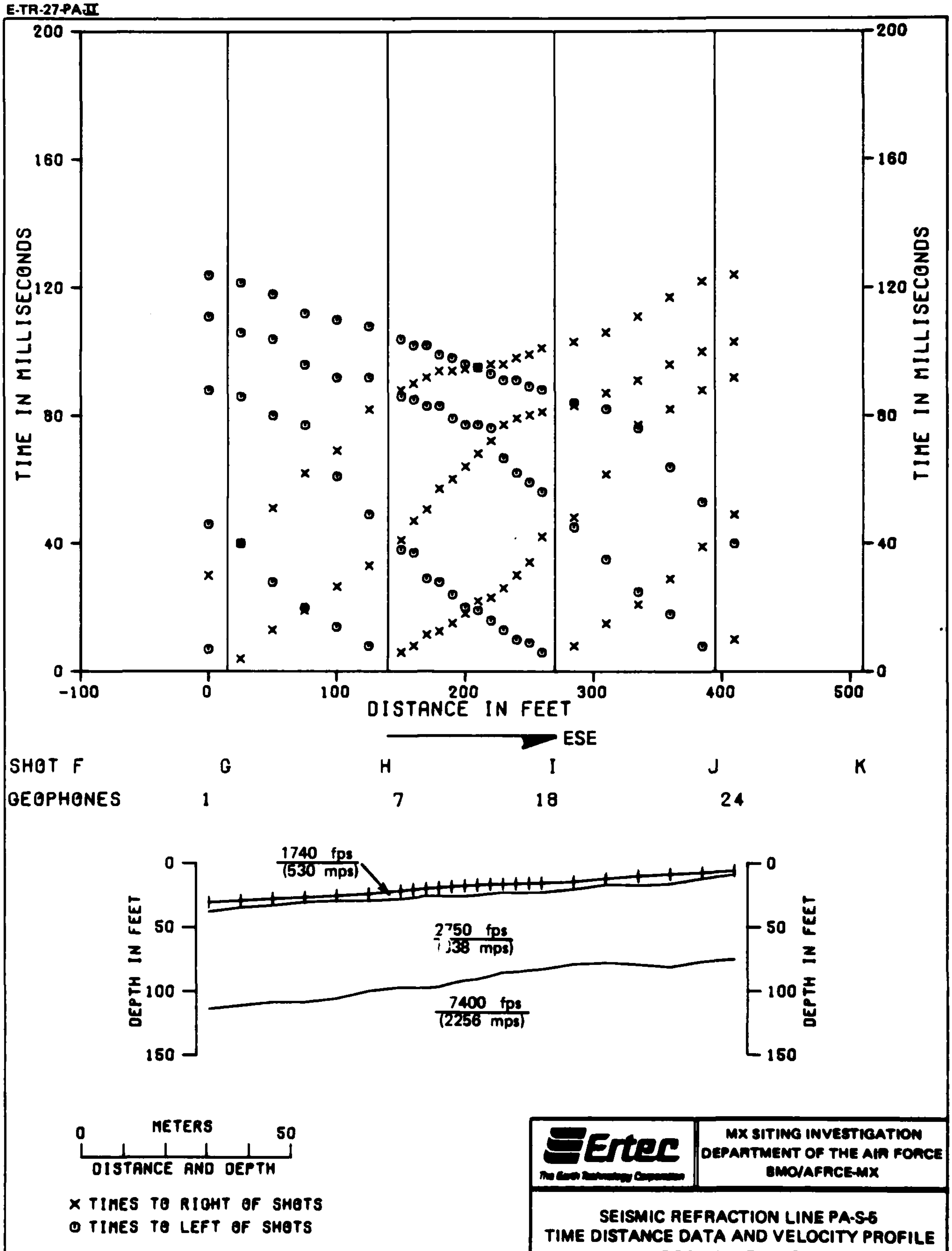
SEISMIC REFRACTION LINE PA-S-4
TIME DISTANCE DATA AND VELOCITY PROFILE
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-4-4



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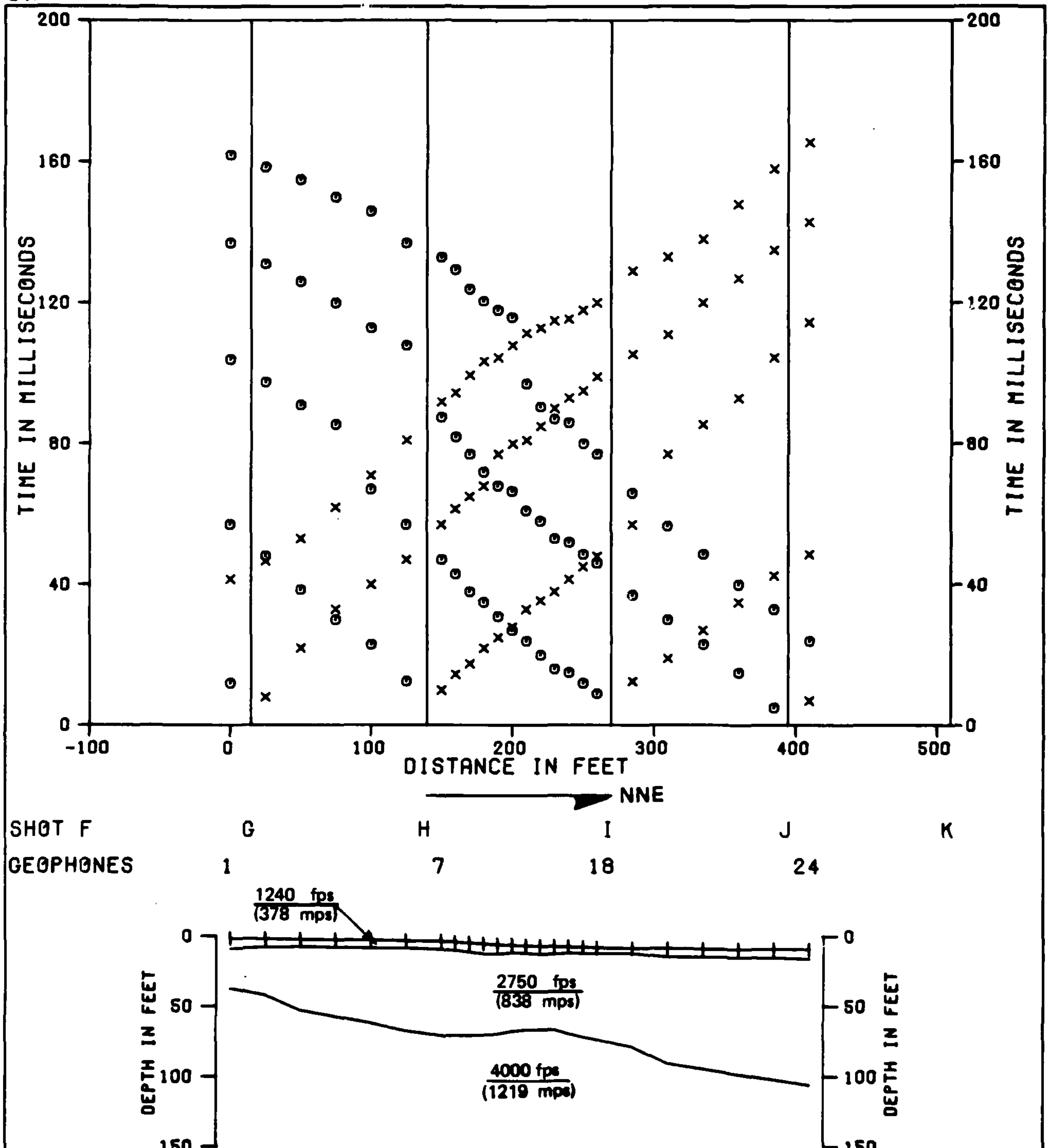
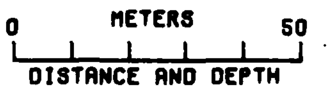
SEISMIC REFRACTION LINE PA-S-5
TIME DISTANCE DATA AND VELOCITY PROFILE
PAHROC VALLEY, NEVADA

30 JUN 81 FIGURE II-4-5

E-TR-27-PA-II





× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

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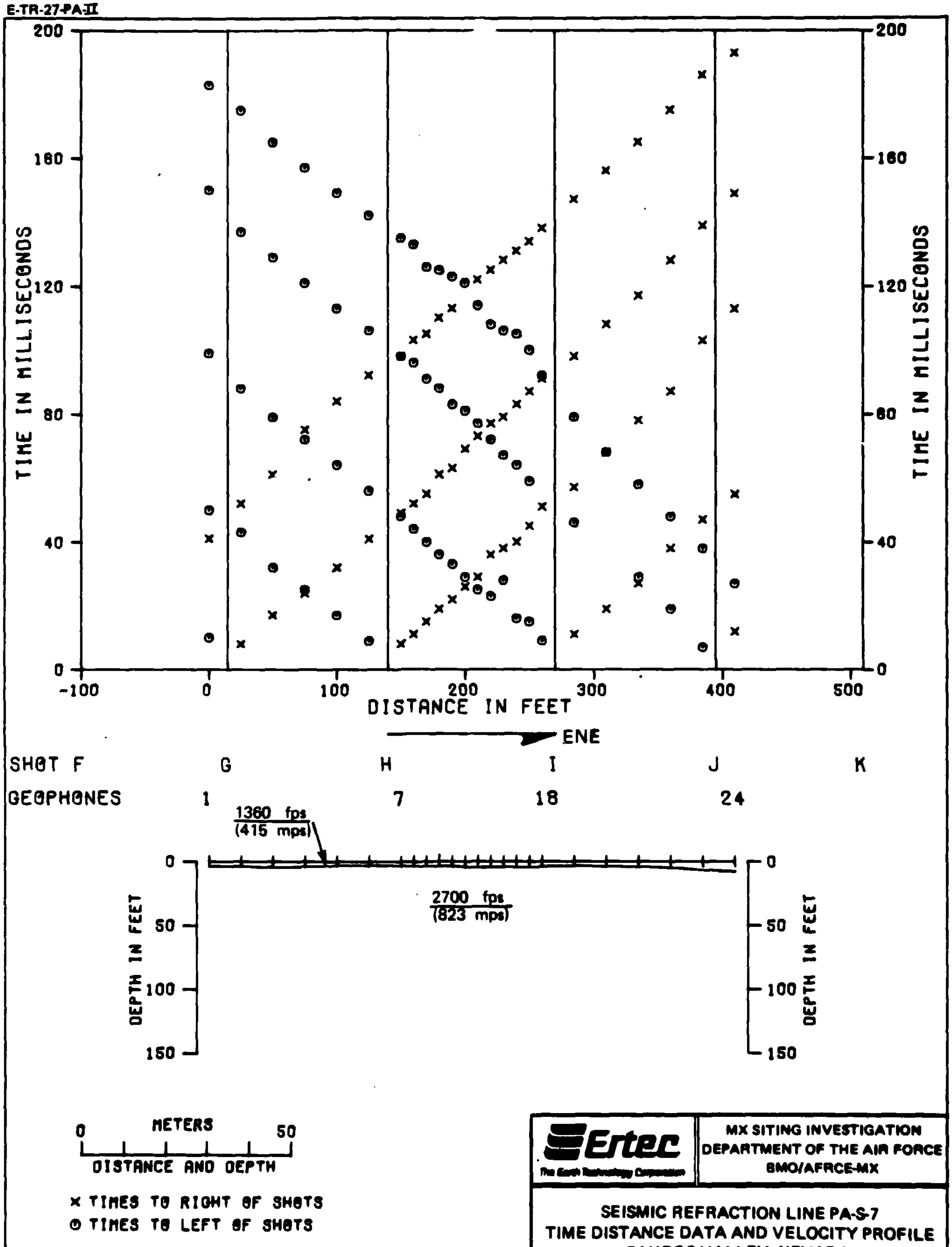
SEISMIC REFRACTION LINE PA-S-6
TIME DISTANCE DATA AND VELOCITY PROFILE
PAHROC VALLEY, NEVADA

30 JUN 81 FIGURE II-4-6



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SEISMIC REFRACTION LINE PA-S-7
TIME DISTANCE DATA AND VELOCITY PROFILE
PAHROC VALLEY, NEVADA

30 JUN 81

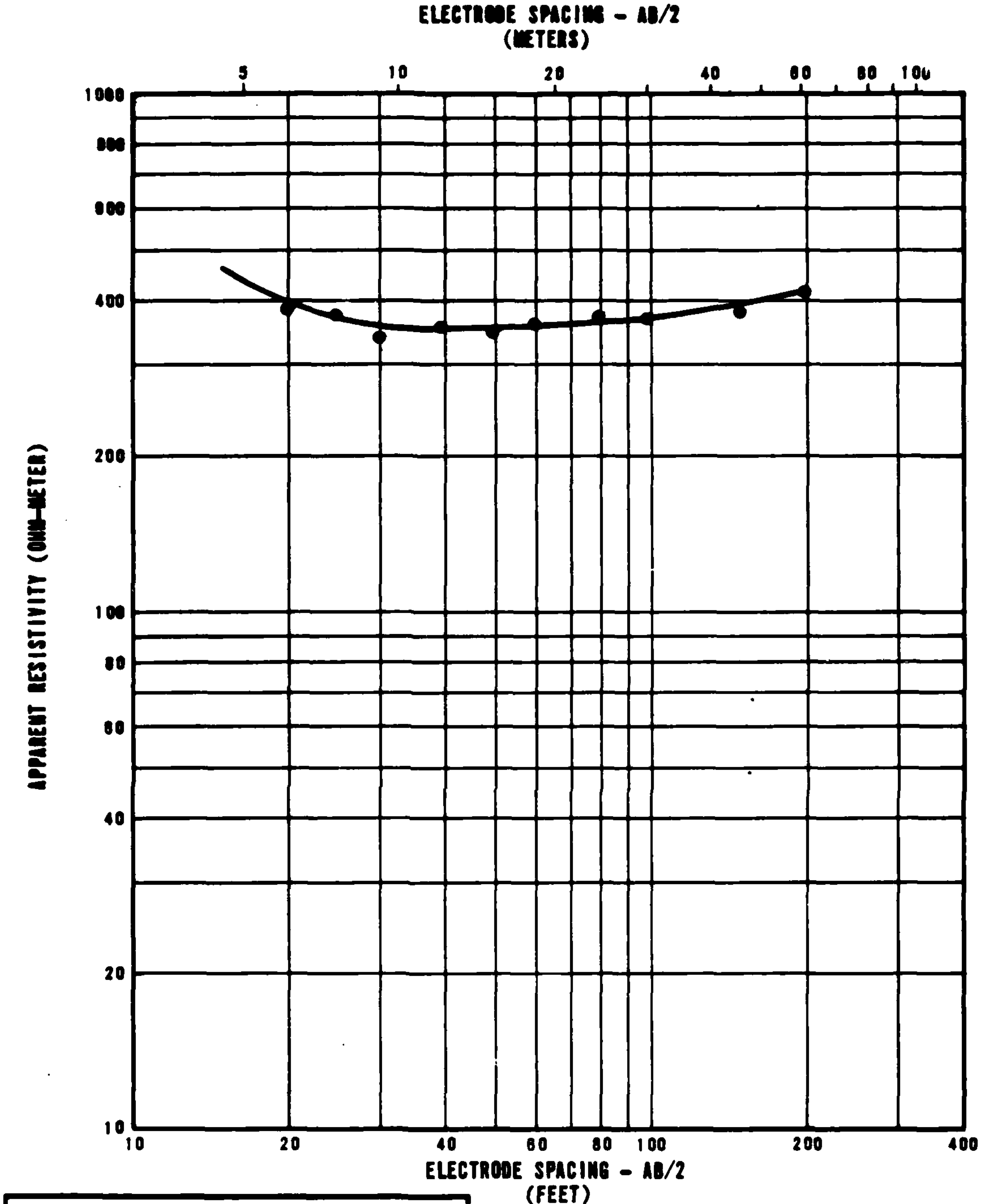
FIGURE II-4-7

5.0 ELECTRICAL RESISTIVITY DATA

Explanation: Each figure in this section presents the data obtained from a resistivity sounding and a tabulated model of resistivity layers that would produce a curve similar to the observed curve.

The upper portion of the figures is a graph in which measured apparent resistivity values in ohm-meters are plotted versus one-half the distance between the current electrodes.

The interpreted model tabulated at the bottom of the page shows a combination of true resistivity layers and thicknesses obtained by matching theoretical curves to the field curve.



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	640
5	2	360
77	23	490

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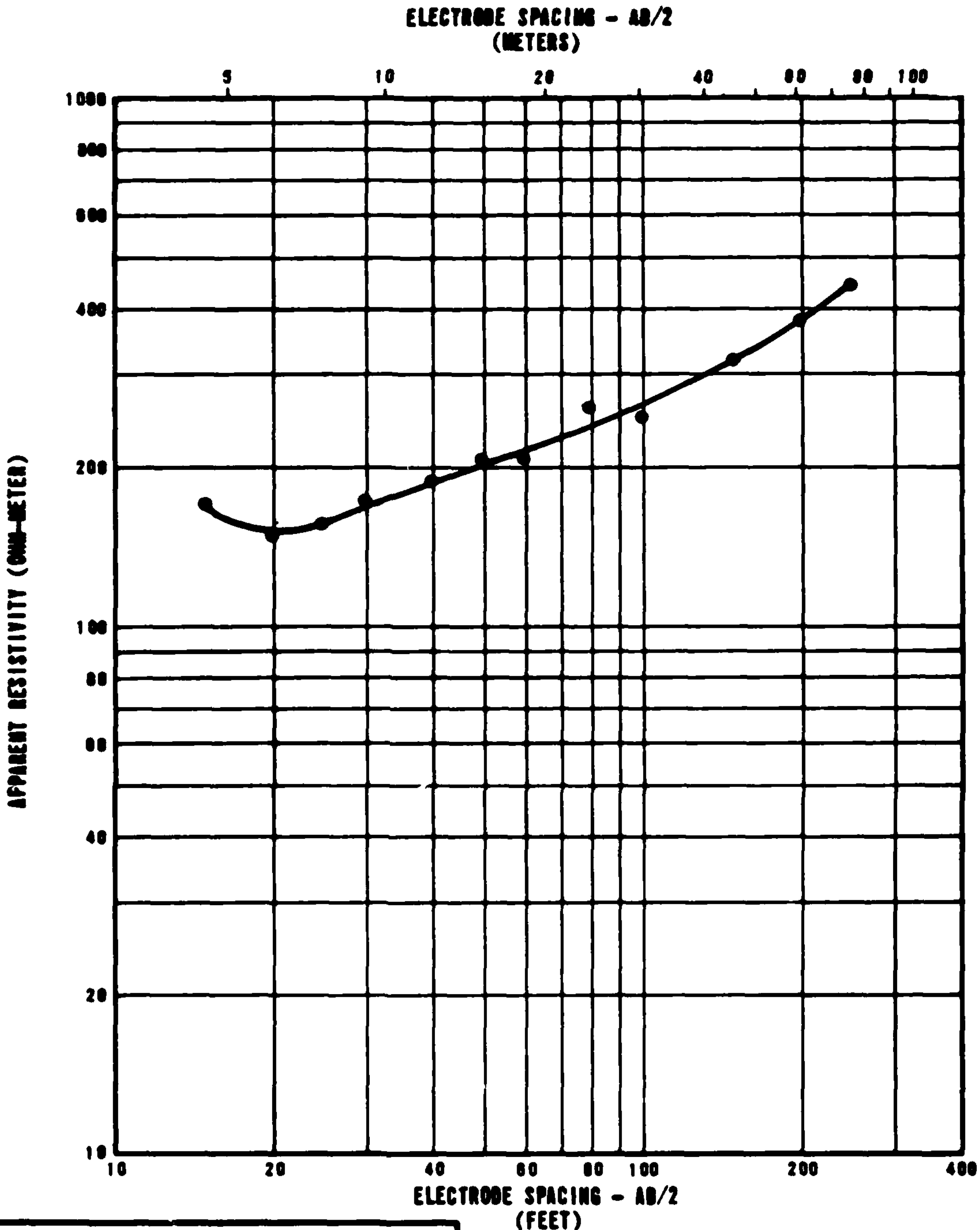
RESISTIVITY SOUNDING PA-R-1
SOUNDING CURVE AND INTERPRETATION
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-6-1



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	230
6	2	120
26	8	320
37	11	210
91	28	1200

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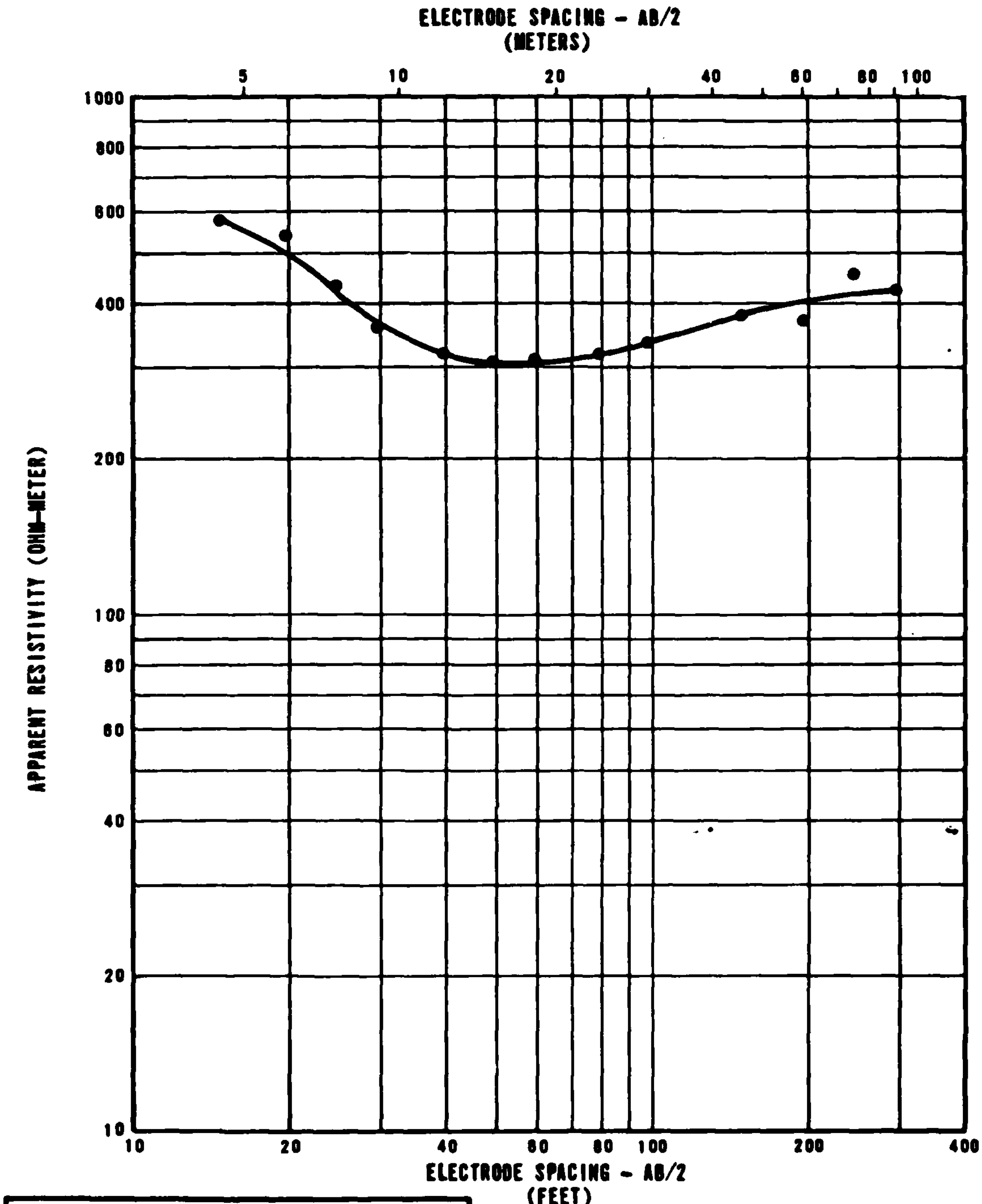
RESISTIVITY SOUNDING PA-R-2
SOUNDING CURVE AND INTERPRETATION
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-6-2



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	720
9	3	260
46	14	450

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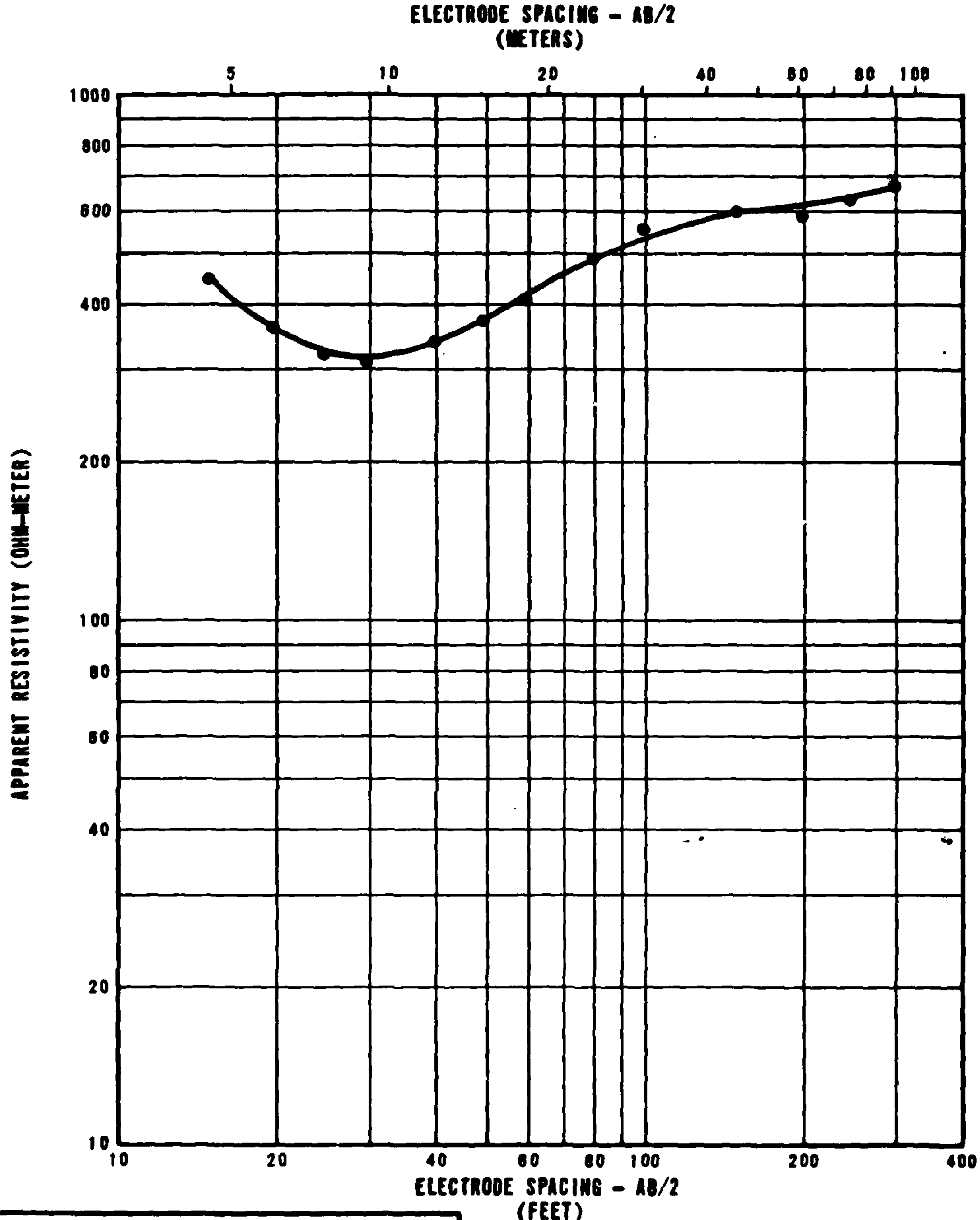
RESISTIVITY SOUNDING PA-R-3
SOUNDING CURVE AND INTERPRETATION
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-6-3



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	720
7	2	160
20	6	810
79	24	480
149	45	860

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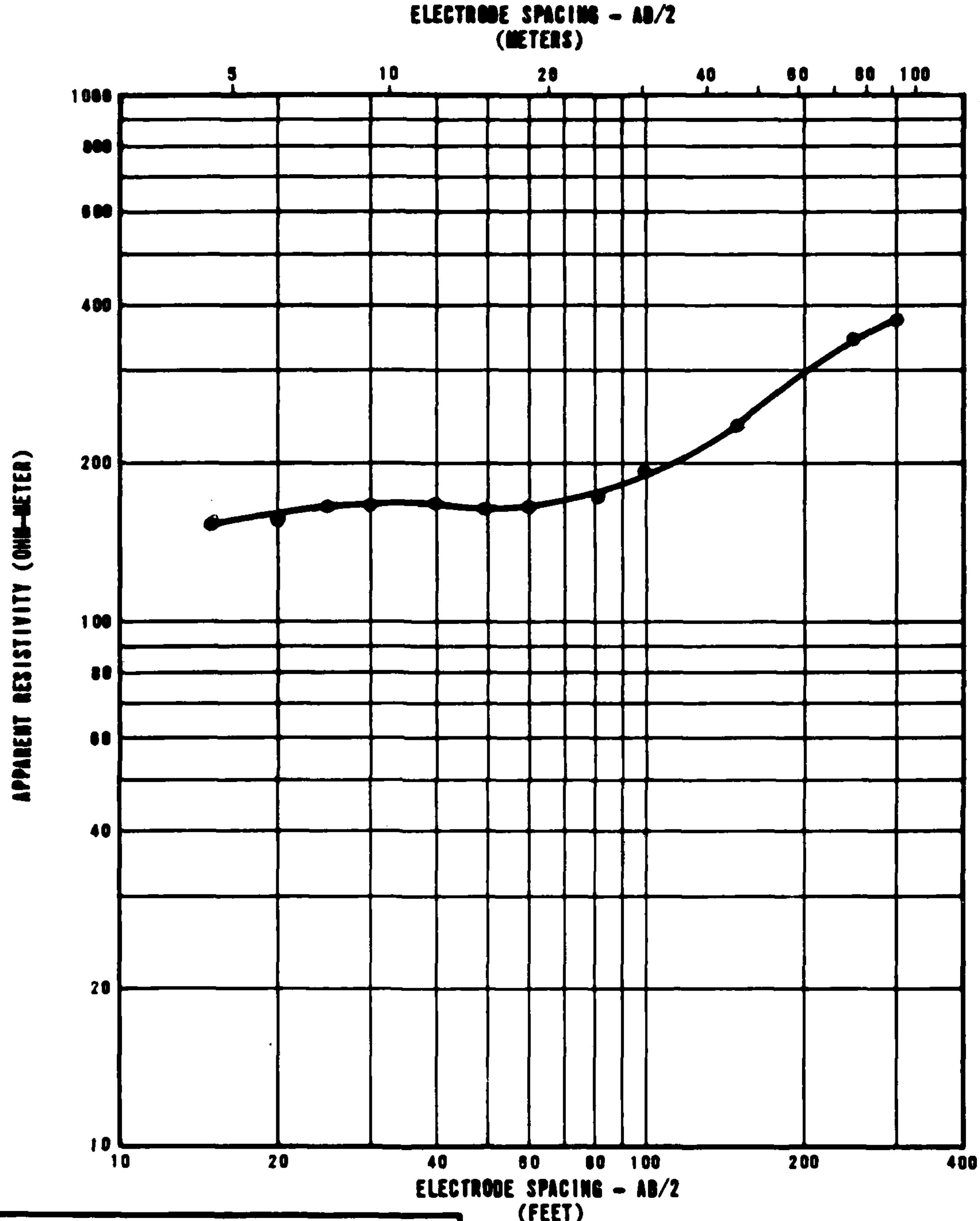
RESISTIVITY SOUNDING PA-R-4
SOUNDING CURVE AND INTERPRETATION
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-5-4



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	130
9	3	200
20	6	140
71	22	730

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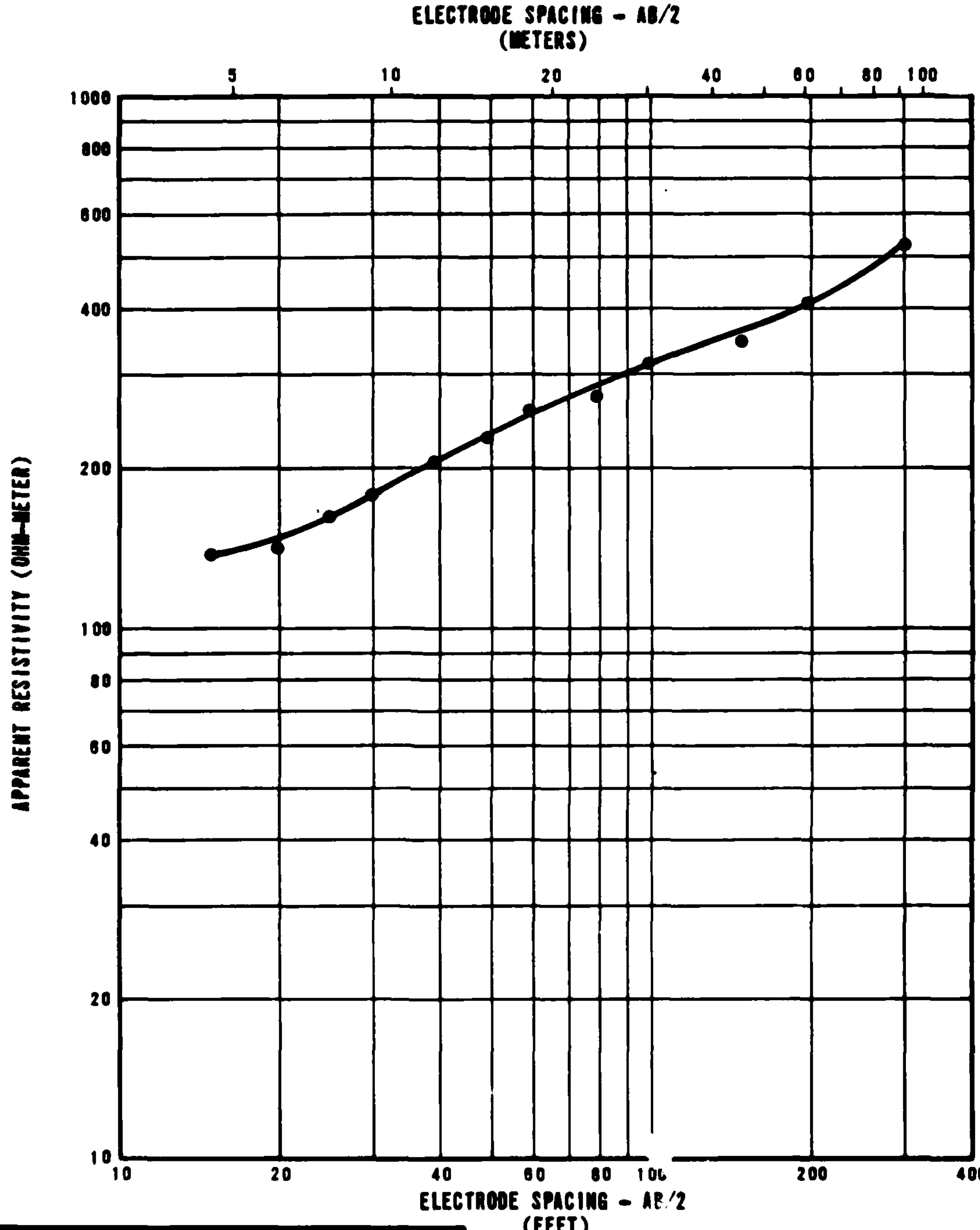
RESISTIVITY SOUNDING PA-R-5
SOUNDING CURVE AND INTERPRETATION
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE III-5-6



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	130
20	6	470

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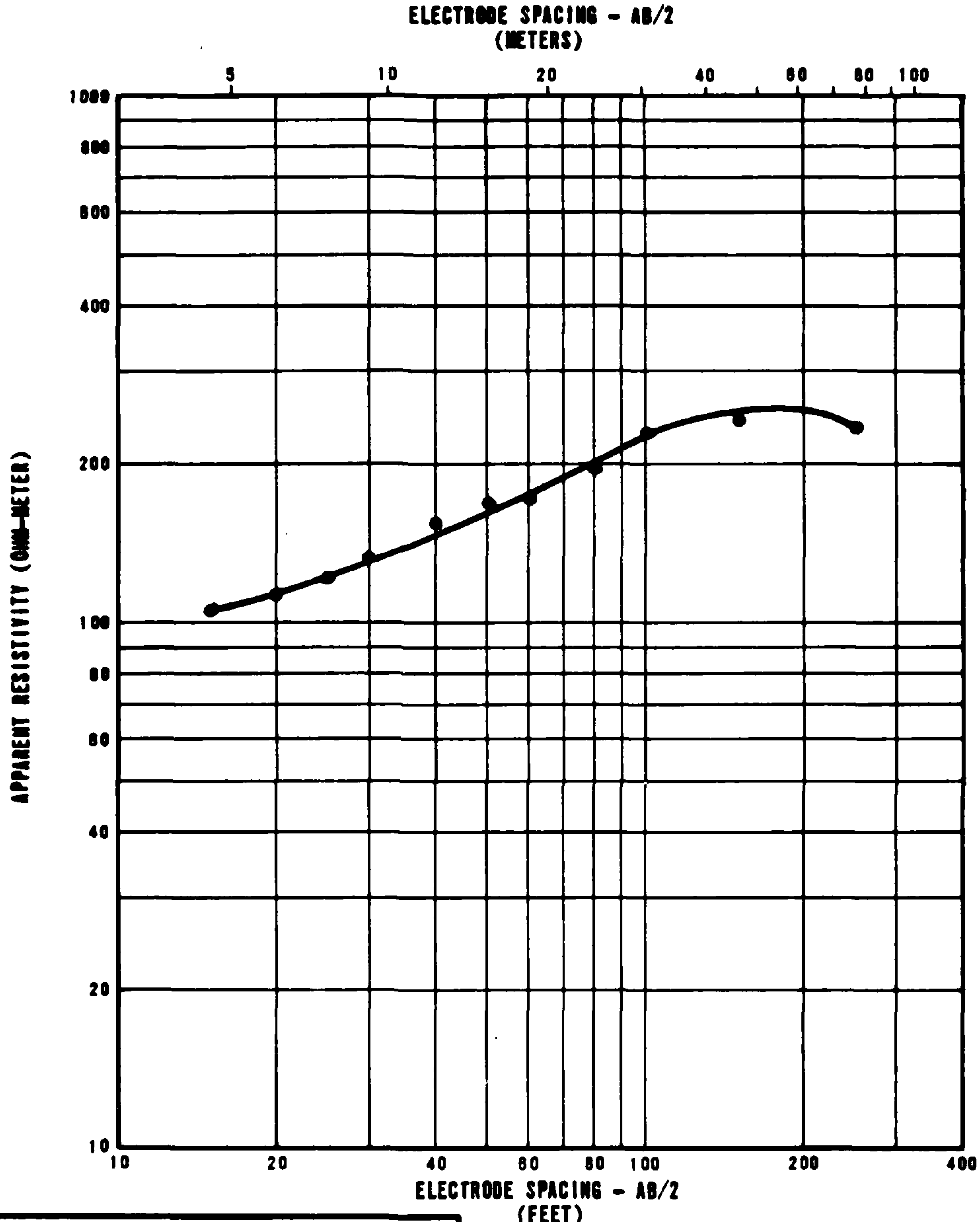
RESISTIVITY SOUNDING PA-R-6
SOUNDING CURVE AND INTERPRETATION
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-6-6

USAF-16



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	95
14	4	270
54	16	420
108	33	180

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RESISTIVITY SOUNDING PA-R-7
SOUNDING CURVE AND INTERPRETATION
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-6-7

6.0 BORING LOGS

Explanation: All data from borings and trenches are presented on standard Ertec Western logs in Sections 6.0 and 7.0. Explanations of the column headings on the logs are as follows:

A. Designations - Borings and trenches are identified as follows:

PA-B-1
PA - abbreviation for the valley (e.g., PA-Pahroc)
B - abbreviation for activity (e.g., B-boring, T-trench, P-test pit)
1 - number of activity

B. Sample Type - Different sampling techniques were used and the symbols are explained at the bottom of the boring logs. For details of sampling techniques, see Section A5.0 of Appendix in Volume I (E-TR-27-PA-I). Horizontal lines, to scale, indicate the depth where sampling was attempted.

C. Percent Recovery - The numbers shown represent the ratio (in percent) of the soil sample recovered in the sampler to the full penetration of the sampler.

D. N Value - Corresponds to standard penetration resistance, which is number of blows required to drive a standard split-spoon sampler for the second and third of three 6-inch (15-cm) increments with a 140-pound (63.5 kg) hammer falling 30 inches (76 cm) (ASTM D 1586-67).

E. Depth - Corresponds to depth below ground surface in meters and feet.

F. Lithology - Graphic representation of the soil and rock types.

G. USCS - Unified Soil Classification System symbols (see Table II-6-1 for complete details).

H. Soil Description - Except in cases where samples were classified based on laboratory test data, the descriptions are based on visual classification. The procedures outlined in ASTM D 2487-69, Classification of Soils for Engineering Purposes, and D 2488-69, Description of Soils (Visual-Manual Procedure), were followed. A solid line across the column indicates a change in strata at the depth shown.

Definitions of some of the terms and criteria to describe soils and conditions encountered during the exploration follow.

Gradation : A coarse-grained soil is well graded if it has a wide range in grain size and substantial amounts of most intermediate particle sizes.

Poorly graded indicates that the soil consists predominantly of one size (uniformly graded) or has a wide range of sizes with some intermediate sizes obviously missing (gap-graded).

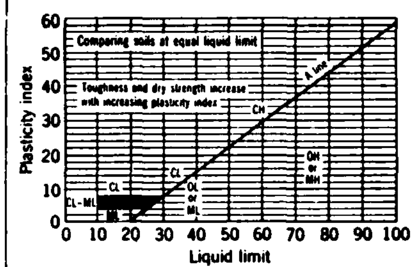
Moisture :	Dry	- no feel of moisture-dry like powder
	Slightly Moist	- much less than optimum moisture
	Moist	- near optimum moisture for soil provides apparent cohesion
	Very Moist	- much greater than optimum moisture
	Wet	- at or near saturation

Consistency: Consistency descriptions of coarse-grained soils (GW, GP, GM, GC, SW, SP, SM, SC) follow.

Major divisions		Field Identification Procedures (Excluding particles larger than 3 in. and basing fractions on estimated weights)	Group Symbols[a]	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria	
Coarse-grained soils: More than half of material is *larger* than No. 200 sieve size[b] (The No. 200 sieve size is about the smallest particle visible to naked eye). Gravels: More than half of coarse fraction is larger than No. 4 sieve size (For visual classification, the ¼ in. size may be used as equivalent to the No. 4 sieve size)	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes	*GW*	Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbols in parentheses	Use grain size curve in identifying the fractions as given under field identification. Determine percentages of gravel and sand from grain size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size) coarse grained soils are classified as follows: Less than 5% *GW, GP, SW, SP*; More than 12% *GM, GC, SM, SC*; 5% to 12% *Borderline* cases requiring use of dual symbols	$C_U = \frac{D_{60}}{D_{10}}$ Greater than 4; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3
		Predominantly one size or a range of sizes with some intermediate sizes missing	*GP*	Poorly graded gravels, gravel-sand mixtures, little or no fines			Not meeting all gradation requirements for *GW*
	Gravels with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures see *ML* below)	*GM*	Silty gravels, poorly graded gravel-sand-silt mixtures	For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics		Atterberg limits below "A" line, or *PI* less than 4 / Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of *dual symbols*
		Plastic fines (for identification procedures, see *CL* below)	*GC*	Clayey gravels, poorly graded gravel-sand-clay mixtures			Atterberg limits above "A" line, with *PI* greater than 7
Sands: More than half of coarse fraction is smaller than No. 4 sieve size	Clean sands (little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes	*SW*	Well graded sands, gravelly sands, little or no fines	Example: *Silty sand,* gravelly; about 20% hard, angular gravel particles ½-in. maximum size; rounded and subangular sand grains coarse to fine, about 15% nonplastic fines with low dry strength; well compacted and moist in place; alluvial sand; (*SM*)		$C_U = \frac{D_{60}}{D_{10}}$ Greater than 6; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3
		Predominantly one size or a range of sizes with some intermediate sizes missing	*SP*	Poorly graded sands, gravelly sands, little or no fines			Not meeting all gradation requirements for *SW*
	Sands with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures, see *ML* below)	*SM*	Silty sands, poorly graded sand-silt mixtures			Atterberg limits below "A" line or *PI* less than 5 / Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols
		Plastic fines (for identification procedures, see *CL* below)	*SC*	Clayey sands, poorly graded sand-clay mixtures			Atterberg limits below "A" line with *PI* greater than 7

Identification Procedures on Fraction Smaller than No. 40 Sieve Size

Major divisions		Dry Strength (crushing characteristics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)	Group Symbols	Typical Names	Information Required for Describing Soils
Fine-grained soils: More than half of material is *smaller* than No. 200 sieve size (The No. 200 sieve size is about the smallest particle visible to naked eye)	Silts and clays liquid limit less than 50	None to slight	Quick to slow	None	*ML*	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; colour in wet condition, odour if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses
		Medium to high	None to very slow	Medium	*CL*	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
		Slight to medium	Slow	Slight	*OL*	Organic silts and organic silt-clays of low plasticity	For undisturbed soils add information on structure, stratification, consistency in undisturbed and remoulded states, moisture and drainage conditions
	Silts and clays liquid limit greater than 50	Slight to medium	Slow to none	Slight to medium	*MH*	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
		High to very high	None	High	*CH*	Inorganic clays of high plasticity, fat clays	Example: *Clayey silt,* brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (*ML*)
		Medium to high	None to very slow	Slight to medium	*OH*	Organic clays of medium to high plasticity	
Highly Organic Soils		Readily identified by colour, odour, spongy feel and frequently by fibrous texture			*Pt*	Peat and other highly organic soils	



Plasticity chart
for laboratory classification of fine grained soils

From Wagner, 1957.
[a] *Boundary classifications.* Soils possessing characteristics of two groups are designated by combinations of group symbols. For example *GW–GC*, well graded gravel-sand mixture with clay binder.
[b] All sieve sizes on this chart are U.S. standard.

Field Identification Procedure for Fine Grained Soils or Fractions

These procedures are to be performed on the minus No. 40 sieve size particles, approximately 1/64 in. For field classification purposes, screening is not intended, simply remove by hand the coarse particles that interfere with the tests.

Dilatancy (Reaction to shaking):
After removing particles larger than No. 40 sieve size, prepare a pat of moist soil with a volume of about one-half cubic inch. Add enough water if necessary to make the soil soft but not sticky.
Place the pat in the open palm of one hand and shake horizontally, striking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pat which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pat stiffens and finally it cracks or crumbles. The rapidity of appearance of water during shaking and of its disappearance during squeezing assist in identifying the character of the fines in a soil.
Very fine clean sands give the quickest and most distinct reaction whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.

Dry Strength (Crushing characteristics):
After removing particles larger than No. 40 sieve size, mould a pat of soil to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven, sun or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity.
High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty fine sands and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

Toughness (Consistency near plastic limit):
After removing particles larger than the No. 40 sieve size, a specimen of soil about one-half inch cube in size, is moulded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface or between the palms into a thread about one-eight inch in diameter. The thread is then folded and re-rolled repeatedly. During this manipulation the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached.
After the thread crumbles, the pieces should be lumped together and a slight kneading action continued until the lump crumbles.
The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays which occur below the A-line.
Highly organic clays have a very weak and spongy feel at the plastic limit.

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UNIFIED SOIL CLASSIFICATION SYSTEM
PAHROC VALLEY, NEVADA

30 JUN 81

TABLE II-6-1

Consistency	N Value (ASTM D 1586-67)
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	>50

Consistency descriptions of fine-grained soils (ML, CL, MH, CH) are as follows:

Consistency	Shear Strength (ksf)	Shear Strength (kn/m^2)	Field Guide
Very Soft	0.25	12	Sample with height equal to twice the diameter, sags under own weight
Soft	0.25-0.50	12 - 24	Can be squeezed between thumb and forefinger
Firm	0.50-1.00	24-48	Can be molded easily with fingers
Stiff	1.00-2.00	48-96	Can be imprinted with slight pressure from fingers
Very Stiff	2.00-4.00	96-192	Can be imprinted with considerable pressure from fingers
Hard	over 4.00	over 192	Cannot be imprinted by fingers

Grain Shape: Angular - particles have sharp edges and relatively plane sides with unpolished surfaces.

Subangular - particles are similar to angular but have somewhat rounded edges.

Subrounded - particles exhibit nearly plane sides but have well-rounded corners and edges.

	Rounded - particles have smoothly curved sides and no edges.
Calcareous :	Containing calcium carbonate; presence of calcium carbonate is commonly identified on the basis of reaction with dilute hydrochloric acid.
Caliche :	Soils cemented by calcium carbonate and/or other soluble minerals by upward-moving solutions.
Degree of Cementation:	(Stages of development of caliche profile)

Stage	Gravelly Soils	Nongravelly Soils
I	Thin, discontinuous pebble coatings	Few filaments or faint coatings
II	Continuous pebble coatings, some interpebble fillings	Few to abundant nodules, flakes, filaments
III	Many interpebble fillings	Many nodules and internodular fillings
IV	Laminar horizon overlying plugged horizon	Increasing carbonate impregnation

Secondary Material : Example - Sand with trace to some silt

Trace - 5-12% (by dry weight)
Little - 13-20% (by dry weight)
Some - >20% (by dry weight)

Plasticity : Plasticity index is the range of water content, expressed as a percentage of the weight of the oven-dried soil, through which the soil is plastic. It is defined as the liquid limit minus the plastic limit. Descriptive ranges used on the logs include:

Nonplastic (PI, 0 - 4)
Slightly Plastic (PI, 4 - 15)
Medium Plastic (PI, 15 - 30)
Highly Plastic (PI, >30)

Cobbles and Boulders : A cobble is a rock fragment, usually rounded by weathering or abrasion, with an average diameter ranging between 3 and 12 inches (8 and 30 cm).

A boulder is a rock fragment, usually rounded by weathering or abrasion, with an average diameter of 12 inches (30 cm) or more.

I. Remarks - This column was provided on boring and trench logs for comments regarding drilling difficulty, number and size of cobbles or boulders encountered, loss of drilling fluid in the boring, trench wall stability, and other conditions encountered during drilling and excavations.

J. Dry Density and Moisture Content - The boring logs include a graphical display of laboratory test results for dry density (ASTM D 2937-71) in pounds per cubic foot and kilograms per cubic meter and moisture content (ASTM D 2216-71) in percent from representative samples taken during drilling. The symbols are explained at the bottom of the boring logs.

K. Sieve Analysis - The numbers represent the percentage by dry weight (ASTM D 422-63) of each of the following soil components:

GR - Gravel, rock particles that will pass a 3-inch (76-mm) sieve and are retained on No. 4 (4.75 mm) sieve.

SA - Sand, soil particles passing No. 4 sieve and retained on No. 200 (0.075 mm) sieve.

FI - Fines, silt or clay soil particles passing No. 200 sieve.

L. Atterberg Limits (LL and PI) -

LL - Liquid Limit, the water content corresponding to the arbitrary limit between the liquid and plastic states of consistency of a soil (ASTM D 423-66).

PL - Plastic Limit, the water content corresponding to an arbitrary limit between the plastic and the semisolid state of consistency of a soil (ASTM D 424-59).

PI - Plasticity Index, numerical difference between the liquid limit (LL) and the plastic limit (PL) indicating the range of moisture content within which a soil-water mixture is plastic.

NP - Nonplastic.

M. Miscellaneous Information -

Elevations - indicated elevations on the logs are estimated from topographic maps of the study area, within an accuracy of half the contour interval.

Surficial Geologic Unit - indicates the surficial geologic unit in which the activity is located.

Date Drilled - indicates the period from beginning to completion of the activity.

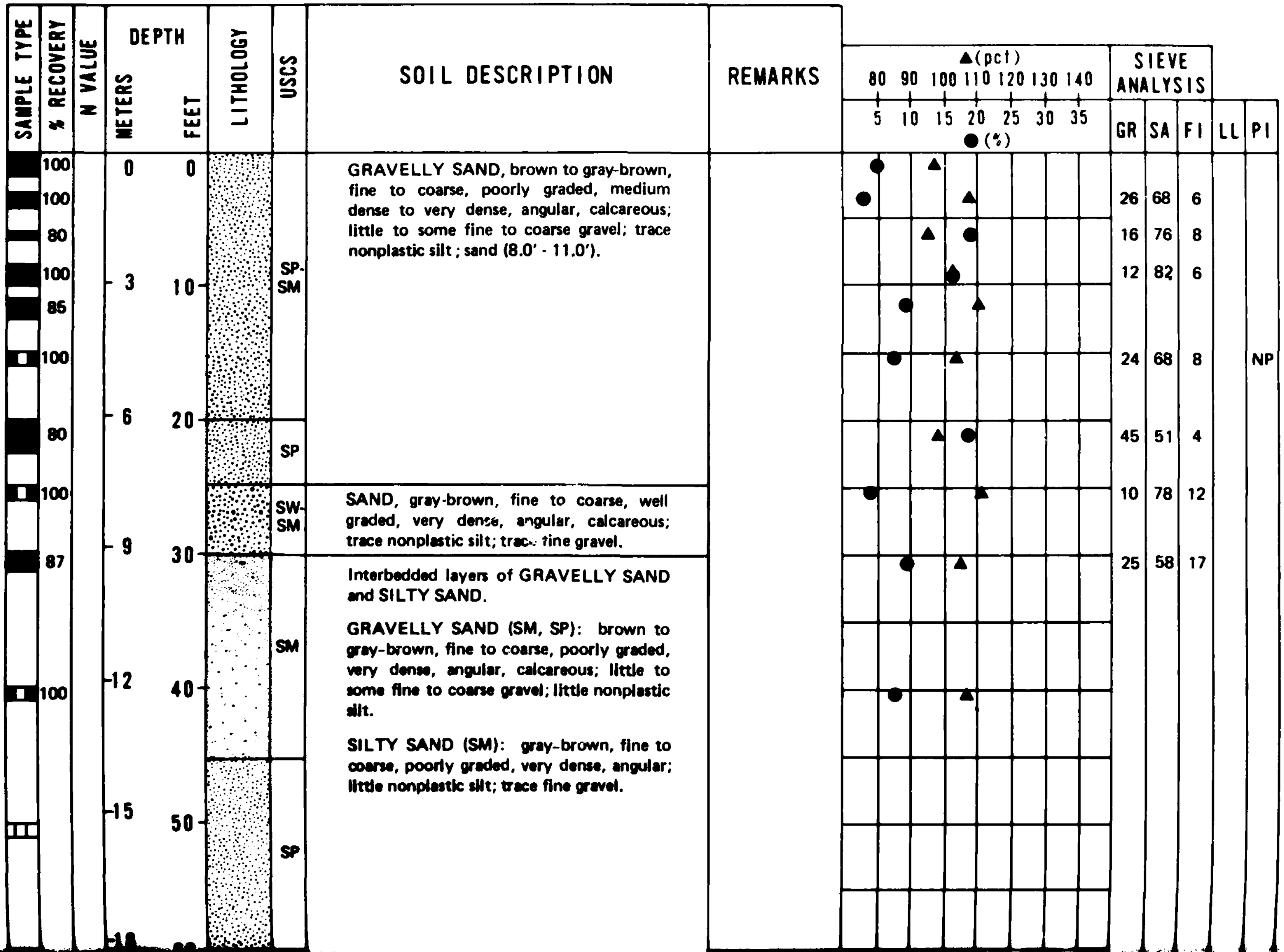
Drilling Method - signifies the type of drilling procedure used such as rotary wash.

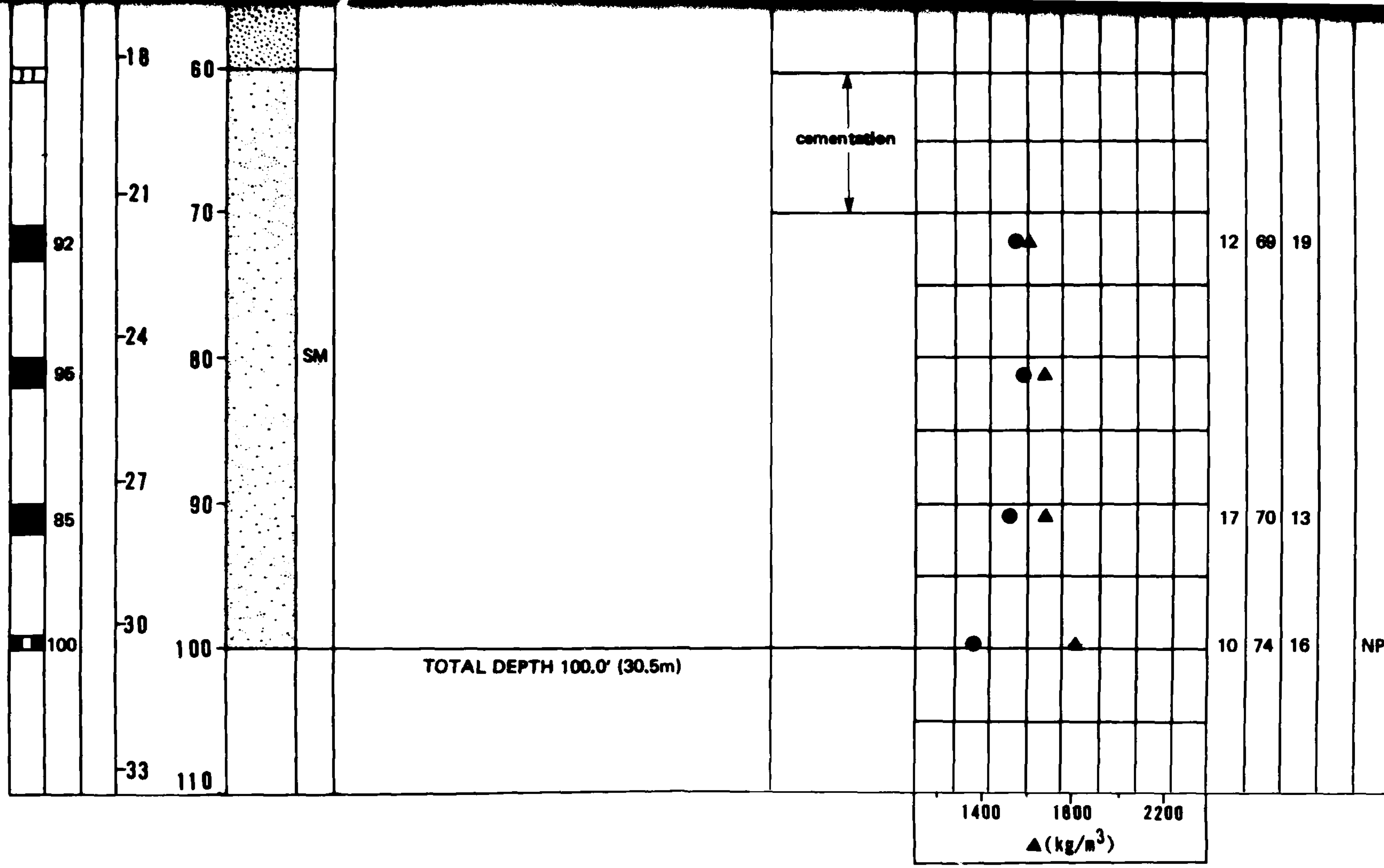
Hole Diameter - nominal size of boring drilled.

Water Level - indicates depth from ground surface to water table where encountered.

Trench Length - length at ground surface of final trench excavation.

Trench Orientation - bearing of longitudinal trench centerline.


SAMPLE TYPE
% RECOVERY
N VALUE
DEPTH
METERS
FEET
LITHOLOGY
USCS
SOIL DESCRIPTION
REMARKS
▲(pcf)
80 90 100 110 120 130 140
5 10 15 20 25 30 35
●(%)
SIEVE ANALYSIS
GR SA FI LL PI
100
100
80
100
85
100
80
100
87
100
0 3 6 9 12 15
0 10 20 30 40 50
SP-SM
SP
SW-SM
SM
SP
GRAVELLY SAND, brown to gray-brown, fine to coarse, poorly graded, medium dense to very dense, angular, calcareous; little to some fine to coarse gravel; trace nonplastic silt; sand (8.0' - 11.0').
SAND, gray-brown, fine to coarse, well graded, very dense, angular, calcareous; trace nonplastic silt; trace fine gravel.
Interbedded layers of GRAVELLY SAND and SILTY SAND.
GRAVELLY SAND (SM, SP): brown to gray-brown, fine to coarse, poorly graded, very dense, angular, calcareous; little to some fine to coarse gravel; little nonplastic silt.
SILTY SAND (SM): gray-brown, fine to coarse, poorly graded, very dense, angular; little nonplastic silt; trace fine gravel.
26 68 6
16 76 8
12 82 6
24 68 8 NP
45 51 4
10 78 12
25 58 17



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE

N - STANDARD PENETRATION RESISTANCE

▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)

● - MOISTURE CONTENT (ASTM: D-2216-71)

BORING DETAILS

ELEVATION	: 4550' (1387m)
SURFICIAL GEOLOGIC UNIT	: A5y/A5i
DATE DRILLED	: 30 November 1979
DRILLING METHOD	: Rotary Wash
HOLE DIAMETER	: 4 7/8" (124mm)
WATER LEVEL	: Not Encountered

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LOG OF BORING PA-B
PAHROC VALLEY, NEVA

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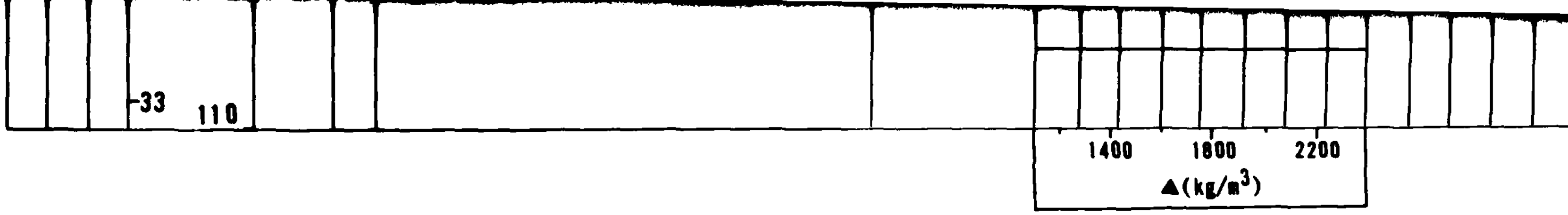

EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE

N - STANDARD PENETRATION RESISTANCE

▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)

● - MOISTURE CONTENT (ASTM: D-2216-71)

NR - NO RECOVERY

BORING DETAILS

ELEVATION	: 4550' (1387m)
SURFICIAL GEOLOGIC UNIT	: A5y/A5i
DATE DRILLED	: 30 November 1979
DRILLING METHOD	: Rotary Wash
HOLE DIAMETER	: 4 7/8" (124mm)
WATER LEVEL	: Not Encountered

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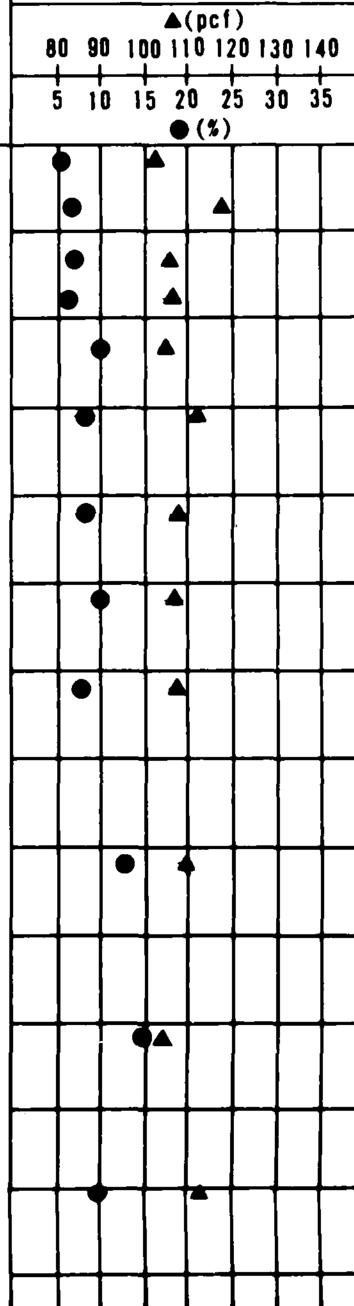
LOG OF BORING PA-B-1
PAHROC VALLEY, NEVADA

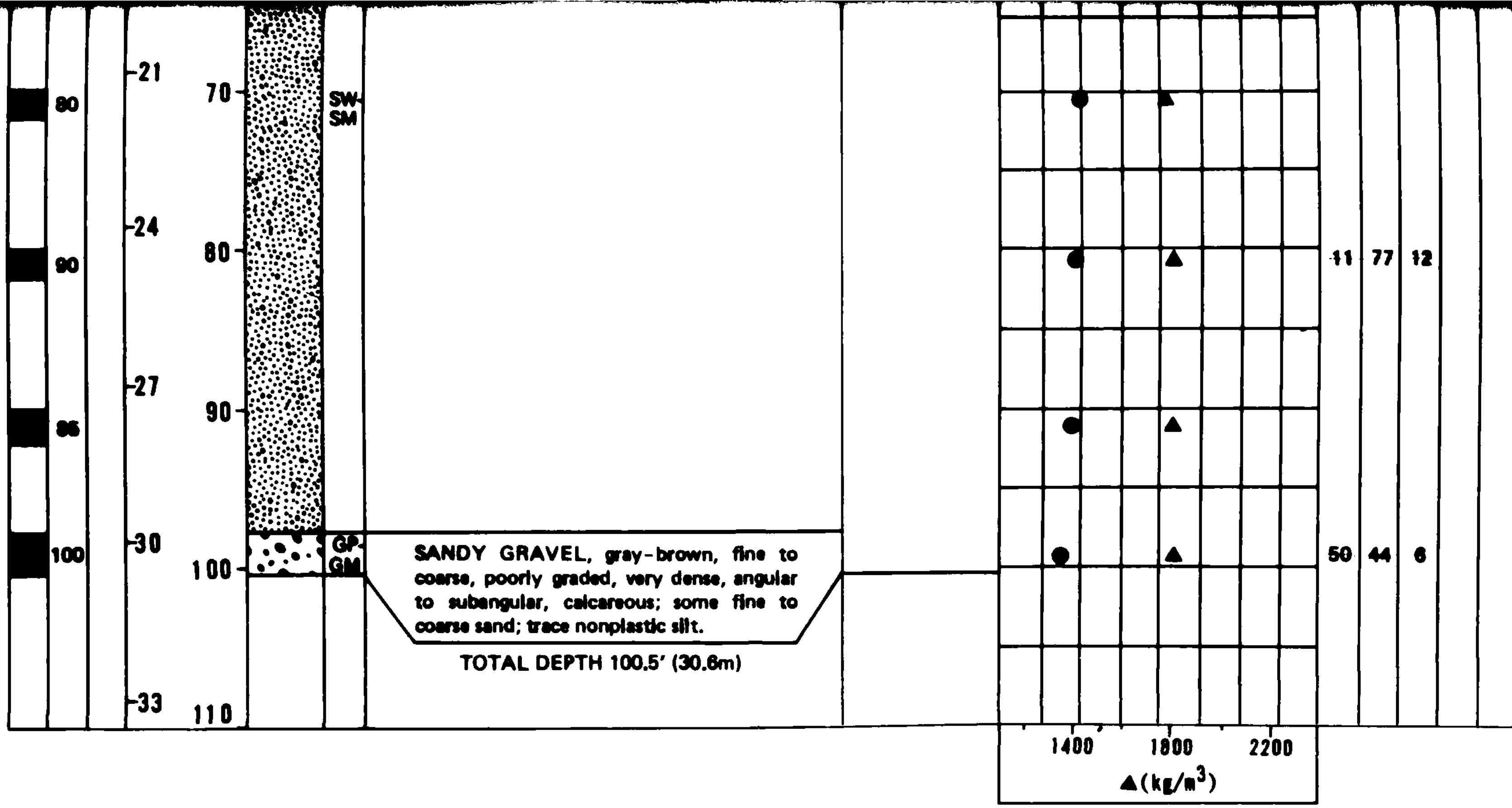
30 JUN 81

FIGURE II-6-1

3

Sample Type	% Recovery	N Value	Depth (Meters)	Depth (Feet)	Lithology	USCS	Soil Description	Remarks	GR	SA	FI	LL	PI
	95		0	0		SM	SILTY SAND, light brown to brown, fine to coarse, poorly graded, medium dense to dense, angular to subangular, calcareous; little nonplastic silt; none to trace fine gravel.		0	80	20		
	87												
	80												
	85		3	10					0	82	18		NP
	92												
	100								6	79	15		
	96		6	20		SW-SM	SAND, light brown, fine to coarse, well graded, dense, angular to subangular, calcareous; trace nonplastic silt.		2	89	9		NP
	84												
	100		9	30									
	85		12	40		SP	GRAVELLY SAND, gray-brown, fine to coarse, poorly graded, very dense, angular to subangular; some fine to coarse gravel.		24	73	3		
	92		15	50			SAND, brown to gray-brown, fine to coarse, very dense, angular to subangular, calcareous; trace fine gravel; trace nonplastic silt.		8	86	6		
	90		18	60									





EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE

N – STANDARD PENETRATION RESISTANCE

▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)

● – MOISTURE CONTENT (ASTM: D-2216-71)

NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 4630' (1411m)
SURFICIAL GEOLOGIC UNIT	: A5y
DATE DRILLED	: 30 November and 1 December 1979
DRILLING METHOD	: Rotary Wash
HOLE DIAMETER	: 4 7/8" (124mm)
WATER LEVEL	: Not Encountered

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LOG OF BORING PA-B-2
PAHROC VALLEY, NEVADA

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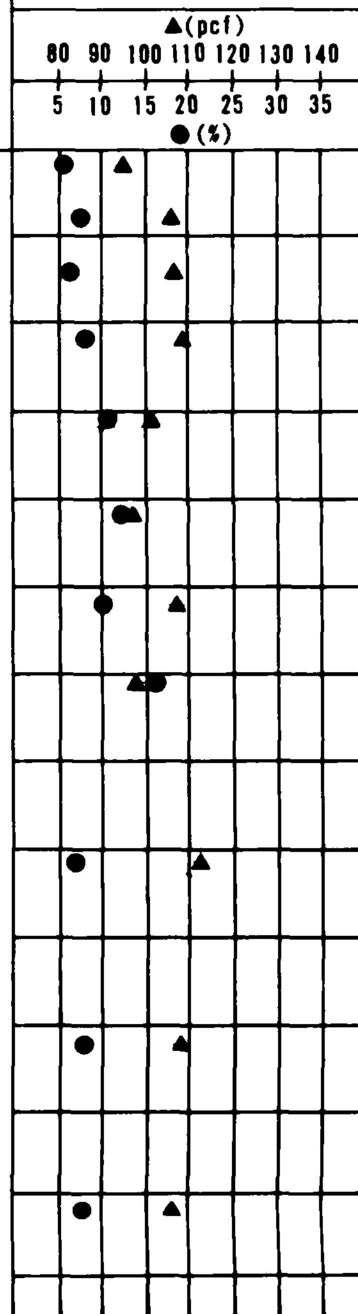
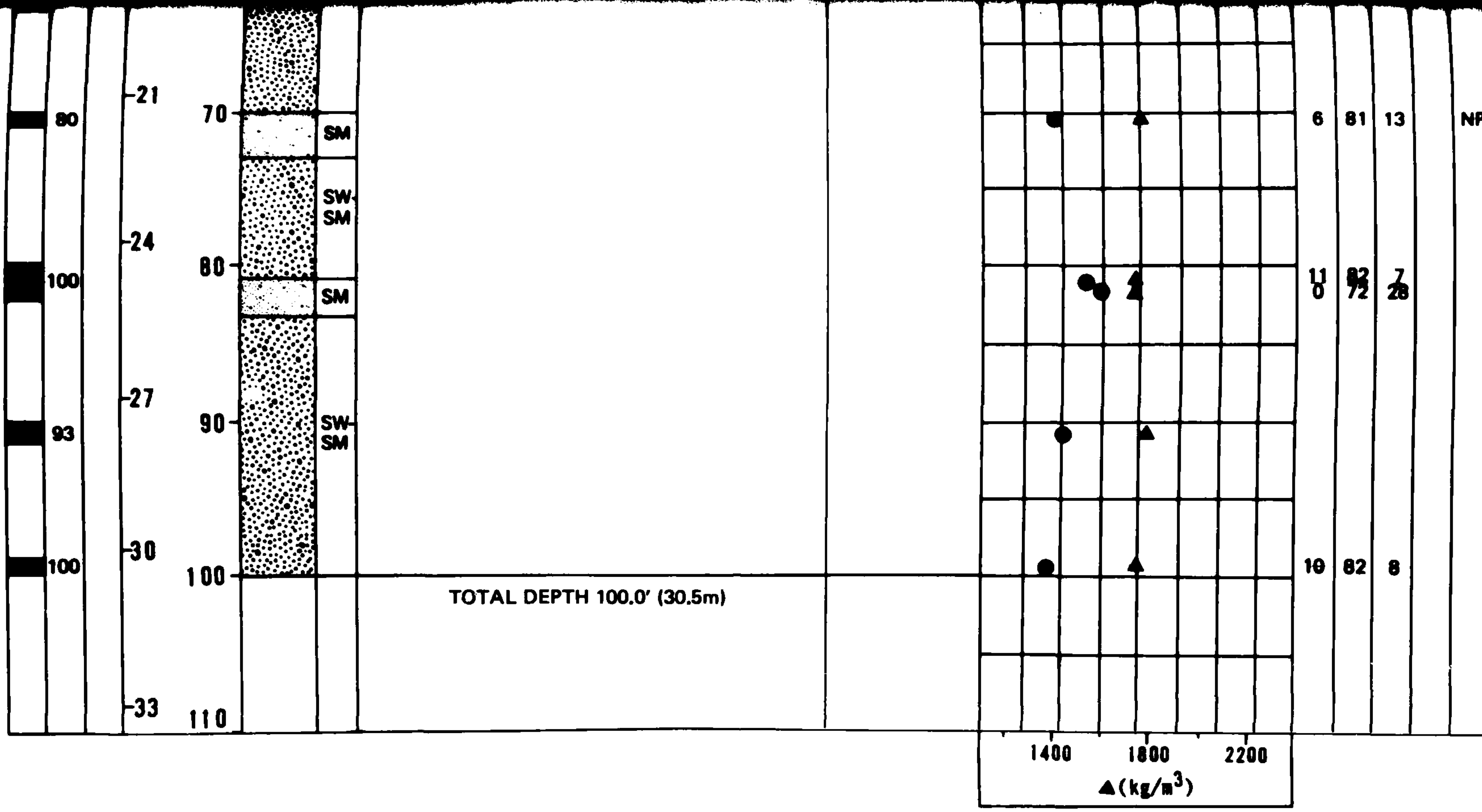
FIGURE II-6-2

Depth (Meters)	Depth (Feet)	Lithology	USCS	Soil Description	Remarks
0 – 6	0 – 20		SM	SILTY SAND, gray-brown, fine to coarse, poorly graded, loose to medium dense, angular to subangular, calcareous; little nonplastic silt; trace fine gravel.	
6 – 12	20 – 40		SP-SM	GRAVELLY SAND, gray-brown, fine to coarse, poorly graded, dense, angular to subangular, calcareous; some fine to coarse gravel; trace nonplastic silt.	
12 –	40 –		SW-SM	SAND, gray-brown, fine to coarse, well graded, dense, angular to subangular, calcareous; trace fine gravel; trace nonplastic silt; silty sand (70.0' - 73.0' and 81.0' - 83.0').	

Depth scale: Meters 0, 3, 6, 9, 12, 15, 18; Feet 0, 10, 20, 30, 40, 50, 60

Sample Type	% Recovery	N Value	GR	SA	FI	LL	PI
	96		6	74	20		
	100						
	88		5	80	15		
	80						
	100		3	82	15		
	96						
	80		40	55	5		NP
	100						
	95		9	83	8		
	85						
	96						





EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N - STANDARD PENETRATION RESISTANCE
- ▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● - MOISTURE CONTENT (ASTM: D-2216-71)
- NR - NO RECOVERY

BORING DETAILS

ELEVATION	: 4520' (1378m)
SURFICIAL GEOLOGIC UNIT	: A5y/A5i
DATE DRILLED	: 1 December 1979
DRILLING METHOD	: Rotary Wash
HOLE DIAMETER	: 4 7/8" (124mm)
WATER LEVEL	: Not Encountered

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LOG OF BORING PA-B-3
PAHROC VALLEY, NEVADA

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FIGURE II-6

7.0 TRENCH AND TEST PIT LOGS

See Section 6.0, "Boring Logs," for explanation.

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0 – 3.0		SM	medium dense; very dense	SILTY SAND, brown, fine to coarse, poorly graded, dry, subangular, calcareous; little nonplastic silt; trace fine gravel; stage IV caliche (2.5' - 3.0').	vertical walls stable	5	77	18		
						TOTAL DEPTH 3.0' (0.9m)	cementation at 3.0' exceeded capacity of Case 580C backhoe					

Depth scale: METERS 0, 1, 2, 3, 4, 5, 6; FEET 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

TRENCH DETAILS

SURFACE ELEVATION : 5060' (1540m)
DATE EXCAVATED : 6 November 1979
SURFICIAL GEOLOGIC UNIT : A5y
TRENCH LENGTH : 6.0' (1.8m)
TRENCH ORIENTATION : N—S

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LOG OF TRENCH PA-T-1
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-7-1

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SM	medium dense (0'–2'); dense (2'–5'); very dense (5'–6')	SILTY SAND, brown, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous; little nonplastic silt; stage III - IV caliche (2.0' - 3.0').	vertical walls stable	2	82	16		
		6				TOTAL DEPTH 6.0' (1.8m)	excavation capacity of Case 580C backhoe exceeded at 6.0'					

Depth scale: meters 0–6; feet 0–20.

TRENCH DETAILS

SURFACE ELEVATION : 4520' (1378m)
DATE EXCAVATED : 6 November 1979
SURFICIAL GEOLOGIC UNIT : A5y (A5i)
TRENCH LENGTH : 10.0' (3.0m)
TRENCH ORIENTATION : E—W

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LOG OF TRENCH PA-T-2
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-7-2

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0–2		GP-GM	dense / very dense	SANDY GRAVEL, light brown, fine to coarse, poorly graded, dry, subangular to subrounded, calcareous; some fine to coarse sand; trace nonplastic silt.	vertical walls stable	46	42	12		
		2				TOTAL DEPTH 2.0' (0.6m)	excavation capacity of Case 580C backhoe exceeded at 2.0'					

Depth scale: Meters 0, 1, 2, 3, 4, 5, 6; Feet 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

TRENCH DETAILS

SURFACE ELEVATION : 4715' (1437m)
DATE EXCAVATED : 15 November 1979
SURFICIAL GEOLOGIC UNIT : A5i
TRENCH LENGTH : 8.0' (2.4m)
TRENCH ORIENTATION : E—W

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LOG OF TRENCH PA-T-3
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-7-3

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SW-SM	loose	GRAVELLY SAND, light brown, fine to coarse, well graded, dry, subangular, calcareous; little fine gravel; trace nonplastic silt; stage IV caliche (5.5' - 7.0').	vertical walls sloughing	19	69	12		
					very dense		vertical walls stable					
						TOTAL DEPTH 7.0' (2.1m)	cementation at 7.0' exceeded capacity of Case 580C backhoe					

Depth scale: meters 0–6; feet 0–20.

TRENCH DETAILS

SURFACE ELEVATION : 4550' (1387m)
DATE EXCAVATED : 15 November 1979
SURFICIAL GEOLOGIC UNIT : A5y/A5i
TRENCH LENGTH : 11.0' (3.4m)
TRENCH ORIENTATION : E–W

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LOG OF TRENCH PA-T-4
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-7-4

E-TR-27-PA-II

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SW-SM	dense	SAND, red-brown, fine to coarse, well graded, slightly moist, subangular, calcareous; trace nonplastic silt; stage III - IV caliche (2.0' - 3.0').	vertical walls stable	1	88	11		
		2			very dense							
	1	4				TOTAL DEPTH 3.0' (0.9m)	cementation at 3.0' exceeded capacity of Case 580C backhoe					
	2	6, 8										
	3	10, 12										
	4	14, 16										
	5	18										
	6	20										

TRENCH DETAILS

SURFACE ELEVATION	: 4630' (1411m)
DATE EXCAVATED	: 15 November 1979
SURFICIAL GEOLOGIC UNIT	: A5y
TRENCH LENGTH	: 8.0' (2.4m)
TRENCH ORIENTATION	: E—W

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LOG OF TRENCH PA-T-5
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-7-5

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SP-SM	medium dense; very dense	GRAVELLY SAND, brown, fine to coarse, poorly graded, dry, subangular, calcareous; some fine to coarse gravel; trace nonplastic silt; occasional cobbles to 11" size.	vertical walls stable	31	60	9		
	2	6				TOTAL DEPTH 6.0' (1.8m)	excavation capacity of Case 580C backhoe exceeded at 6.0'					

TRENCH DETAILS

SURFACE ELEVATION : 4990' (1521m)
DATE EXCAVATED : 15 November 1979
SURFICIAL GEOLOGIC UNIT : A5i/A5y
TRENCH LENGTH : 10.0' (3.0m)
TRENCH ORIENTATION : E—W

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LOG OF TRENCH PA-T-6
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-7-6

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SM	medium dense	SILTY SAND, brown, fine to coarse, poorly graded, dry, angular to subangular, calcareous; little nonplastic silt.	vertical walls stable					
		1										
		2			dense							
	1	3			very dense							
		4				TOTAL DEPTH 4.0' (1.2m)	excavation capacity of Case 580C backhoe exceeded at 4.0'					
		5										

SURFACE ELEVATION: 4830' (1472m)
SURFICIAL GEOLOGIC UNIT: A5y (A5i)

LOG OF TEST PIT PA-P-1

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SM	medium dense	SILTY SAND, brown, fine to coarse, poorly graded, dry, angular to subangular, calcareous; little nonplastic silt; trace fine gravel.	vertical walls sloughing					
		1										
		2										
	1	3										
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4430' (1350m)
SURFICIAL GEOLOGIC UNIT: A5y/A5i

LOG OF TEST PIT PA-P-2

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LOGS OF TEST PITS PA-P-1 AND PA-P-2
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-7-7

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0 – 1.5	0 – 5		SP	medium dense	GRAVELLY SAND, brown, fine to coarse, poorly graded, dry, angular to subangular, calcareous; some fine to coarse gravel; occasional cobbles and boulders to 24" size (2.0' - 5.0').	vertical walls stable	38	58	4		
						TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4360' (1329m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT PA-P-3

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0 – 1.5	0 – 5		SM	medium dense	SILTY SAND, brown, fine to coarse, poorly graded, dry, subangular, calcareous; little nonplastic silt; trace fine gravel.	vertical walls sloughing	5	79	16		
						TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5000' (1524m)
SURFICIAL GEOLOGIC UNIT: A5y (A5i)

LOG OF TEST PIT PA-P-4

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LOGS OF TEST PITS PA-P-3 AND PA-P-4
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-7-8

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0–5		GP	medium dense	SANDY GRAVEL, brown, fine to coarse, poorly graded, slightly moist, subangular, calcareous; some medium to coarse sand.	vertical walls stable					
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4330' (1320m)
SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT PA-P-5

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0–2		SM	dense	SILTY SAND, red-brown, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous; some nonplastic silt; stage III - IV *caliche* (2.0' - 3.0').	vertical walls stable	4	73	23		
		2–3			very dense							
		3				TOTAL DEPTH 3.0' (0.9m)	cementation at 3.0' exceeded capacity of Case 580C backhoe					

SURFACE ELEVATION: 4520' (1378m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT PA-P-6

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LOGS OF TEST PITS PA-P-5 AND PA-P-6
PAHROC VALLEY, NEVADA

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FIGURE II-7-9

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SM	dense (0–3')	GRAVELLY SAND, brown, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous; little fine to coarse gravel; little nonplastic silt; stage III caliche (3.0' - 4.0').	vertical walls stable (0–5')					
		1										
		2										
	1	3			very dense (3–4')							
		4			dense (4–5')							
		5				TOTAL DEPTH 5.0' (1.5m)						
		6										
	2	7										
		8										
		9										
	3	10										

SURFACE ELEVATION: 4710' (1436m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT PA-P-7

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LOG OF TEST PIT PA-P-7
PAHROC VALLEY, NEVADA

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FIGURE II-7-10

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SP	medium dense	SAND, brown, fine to coarse, poorly graded, dry, subangular, calcareous; occasional cobbles to 11" size (0.0'-3.5'); thin lenses of gravel (0.0'-3.5').	vertical walls sloughing					
	1	1–3.5				GRAVELLY SAND, brown, fine to coarse, poorly graded, dry to slightly moist, subangular, calcareous; little fine gravel; stage III caliche (5.5' - 7.0').						
	2	5–7			dense		vertical walls stable					
	3	7–10				TOTAL DEPTH 7.0' (2.1m)						

SURFACE ELEVATION: 4870' (1484m)
SURFICIAL GEOLOGIC UNIT: A5i/A5y

LOG OF TEST PIT PA-P-8

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LOG OF TEST PIT PA-P-8
PAHROC VALLEY, NEVADA

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FIGURE II-7-11

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SM	medium dense	SILTY SAND, brown, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous; some nonplastic silt.	vertical walls stable					
		1										
		2										
	1	3										
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4870' (1484m)
SURFICIAL GEOLOGIC UNIT: A1

LOG OF TEST PIT PA-P-9

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SM	dense	SILTY SAND, brown to white, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous; some slightly plastic silt; stage II - III caliche (2.0' - 3.0').	vertical walls stable					
		1										
		2			very dense							
	1	3				TOTAL DEPTH 3.0' (0.9m)	cementation at 3.0' exceeded capacity of Case 580C backhoe					
		4										
		5										

SURFACE ELEVATION: 4960' (1512m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT PA-P-10

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**LOGS OF TEST PITS PA-P-9 AND PA-P-10
PAHROC VALLEY, NEVADA**

30 JUN 81

FIGURE II-7-12

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0–1.5	0–5		SM	medium dense	SILTY SAND, brown, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous; some nonplastic silt; trace fine gravel.	vertical walls stable					
						TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5110' (1558m)
SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT PA-P-11

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	GR	SA	FI	LL	PI
	0–1.5	0–5		SM	loose	SILTY SAND, brown, fine to coarse, poorly graded, slightly moist, subangular, calcareous; some nonplastic silt.	vertical walls sloughing	2	51	47		
						TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4930' (1503m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT PA-P-12

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LOGS OF TEST PITS PA-P-11 AND PA-P-12
PAHROC VALLEY, NEVADA

30 JUN 81

FIGURE II-7-13

8.0 SURFICIAL SOIL SAMPLE LOGS

Explanation: Finalized logs of the surficial samples are presented in this section. Explanations of the column headings on the logs follow:

A. Designations - Surficial samples are identified as follows:

PA-CS-1
PA - abbreviation for the valley (e.g., PA-Pahroc)
CS - abbreviation for surficial sample
1 - number of activity

B. Ground Surface Elevation - Indicated elevations on the logs are estimated from topographic maps of the study area within an accuracy of half the contour interval.

C. Surficial Geologic Unit - Indicates the surficial geologic unit in which the activity is located.

D. Depth - Indicates depth interval for which soil description is given.

E. USCS - Unified Soil Classification Symbol; see Table II-6-1 of Section 6.0, "Borings Logs," for details of USCS.

F. Soil Description - Soil is described based on field visual descriptions and/or laboratory test results. See Section 6.0, "Boring Logs," for procedures of soil description.

G. Sieve Analysis, LL and PI - These are from results of laboratory tests. See Section 6.0, "Boring Logs," for explanation.

ACTIVITY NUMBER	GROUND SURFACE ELEVATION, FEET (METERS)	SURFICIAL GEOLOGIC UNIT	DEPTH, FEET (METERS)	USCS	SOIL DESCRIPTION	SIEVE ANALYSIS GR	SA	FI	LL	PI
PA-CS-3	4760 (1451)	A5i	0.0 - 2.0 (0.0 - 0.6)	SP-SM	GRAVELLY SAND, brown, fine to coarse, poorly graded, angular to subangular, calcareous; some fine to coarse gravel; trace nonplastic silt.	36	57	7		
PA-CS-8	4620 (1408)	A5i	0.0 - 2.0 (0.0 - 0.6)	GP-GM	SANDY GRAVEL, brown, fine to coarse, poorly graded, angular to subangular, calcareous; some fine to coarse sand; trace nonplastic silt.	68	22	10		
PA-CS-12	4320 (1317)	A1	0.0 - 1.5 (0.0 - 0.5)	SM	SILTY SAND, brown, fine to coarse, poorly graded, subangular, calcareous; little nonplastic silt; trace fine gravel.					
			1.5 - 2.0 (0.5 - 0.6)	GP	SANDY GRAVEL, brown, fine, poorly graded, subangular, calcareous; little fine to coarse sand.					
PA-CS-13	4380 (1335)	A5y/A5i	0.0 - 2.0 (0.5 - 0.6)	SM	SILTY SAND, brown, fine to medium, poorly graded, subangular, calcareous; little nonplastic silt.					
PA-CS-15	4720 (1439)	A5y/A5i	0.0 - 2.0 (0.0 - 0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, subangular, calcareous; little nonplastic silt.					
PA-CS-17	4300 (1311)	A5i/A5y	0.0 - 2.0 (0.0 - 0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, angular to subangular, calcareous; little nonplastic silt.	3	84	13		
PA-CS-19	4560 (1390)	A5y/A5i	0.0 - 2.0 (0.0 - 0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, angular to subangular, calcareous; little nonplastic silt; trace fine gravel; stage IV caliche (2.0').					
PA-CS-23	4610 (1407)	A5y	0.0 - 2.0 (0.0 - 0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, angular to subangular, calcareous; some slightly plastic silt; trace fine gravel; stage II caliche (0.5' - 2.0').					
PA-CS-25	4880 (1488)	A5y	0.0 - 2.0 (0.0 - 0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, angular to subangular, calcareous; some slightly plastic silt.					
PA-CS-27	5020 (1530)	A5y	0.0 - 2.0 (0.0 - 0.6)	SM	GRAVELLY SAND, brown, fine to coarse, poorly graded, angular to subangular, calcareous; some fine gravel; some nonplastic silt; stage II - III caliche (1.5' - 2.0').	21	58	21		

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LOGS OF SURFICIAL SOIL SAMPLES
PAHROC VALLEY, NEVADA

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FIGURE II-6-1

9.0 EXPLANATION OF LABORATORY TEST RESULTS

Explanation: Laboratory test results are presented in this section. Table II-9-1 contains a summary of laboratory test results. This table shows results of sieve analysis; plasticity data; in-situ dry unit weight, moisture content, degree of saturation, and void ratio for drive and Pitcher samples; results of compaction tests; and specific gravity of solids. Other tests such as triaxial compression, unconfined compression, direct shear, consolidation, chemical, and California Bearing Ratio (CBR) are indicated on the table. Tables II-9-2 through II-9-4 and Figures II-9-1 through II-9-2 present results of direct shear, chemical, and CBR tests.

All tests were performed in general accordance with the American Society for Testing and Materials (ASTM) procedures. The following list presents the ASTM designations for the tests performed during the investigation.

Type of Test	ASTM Designations
Particle Size Analysis	D 422-63
Liquid Limit	D 423-66
Plastic Limit	D 424-59
Unit Weight	D 2937-71
Moisture Content	D 2216-71
Compaction	D 1557-70
Specific Gravity of Solids	D 854-58
Triaxial	D 2850-70
Unconfined Compression	D 2166-66
Direct Shear	D 3080-72
Consolidation	D 2435-70
Test for Alkalinity (pH)	D 1067-70
Water Soluble Sodium	D 1428-64
Water Soluble Chloride	D 512-67
Water Soluble Sulphate	D 516-68
Water Soluble Calcium	D 511-72
Calcium Carbonate	D 1126-67
California Bearing Ratio (CBR)	D 1883-73

Explanation for the tables and figures presented in this section are as follows.

A. Activity Number - Boring, trench, test pit, or surface sample designation.

B. Sample Number - Prefix indicates the type of sample; explanation is at the bottom of the table.

C. Sample Interval - This is the depth range measured from ground surface over which the sample was obtained.

D. Percent Finer by Weight - Presents the results of laboratory particle size analysis (ASTM D 422-63) performed on representative soil samples at the depth indicated. The numbers represent the percent (by dry weight) of the total sample weight passing through each sieve size indicated.

E. Atterberg Limits (ASTM D 423-66 and D 424-59)

LL - Liquid Limit, the water content (as percent of soil dry weight) corresponding to the arbitrary limit between the liquid and plastic states of consistency of a soil (ASTM D 423-66).

PL - Plastic Limit, the water content corresponding to an arbitrary limit between the plastic and the semisolid state of consistency of a soil (ASTM D 424-59).

PI - Plasticity Index, numerical difference between the liquid limit (LL) and the plastic limit (PL) indicating the range of moisture content within which a soil-water mixture is plastic.

NP - Nonplastic.

F. USCS - Unified Soil Classification Symbols are given here; see Table II-6-1 in Section 6.0, "Boring Logs," for complete details of USCS system.

G. In Situ - Presents results of tests on drive and Pitcher samples.

Dry Unit Weight - Indicates dry unit weight of soil determined as per ASTM D 2937-71.

Moisture Content - Weight of water reported in percent of dry weight of soil sample (ASTM D 2216-71).

Saturation - The degree of saturation in a soil sample is defined as the ratio (in percent) of the volume of water to the volume of all voids in the soil.

Void Ratio - The numerical ratio of the volume of voids to the volume of solids in a soil specimen.

H. Compacted - Indicates results of laboratory maximum dry density and optimum moisture content test as per ASTM D 1557-70.

I. Specific Gravity of Solids (ASTM D 854-58) - Indicates the ratio of 1) the weight in air of a given volume of soil solids at a stated temperature, to 2) the weight in air of an equal volume of distilled water at a stated temperature.

J. Triaxial - The triaxial compression tests were performed in accordance with the procedures of ASTM D 2850-70. The following explanations and definitions apply.

Triaxial Compression Test - A cylindrical specimen of soil is surrounded by a fluid in a pressure chamber and subjected to an isotropic pressure. An additional compressive load is then applied, directed along the axis of the specimen called the axial load.

Consolidated-Drained (CD) Test - A triaxial compression test in which the soil was first consolidated under an all-around confining stress (test chamber pressure) and was then compressed (and hence sheared) by increasing the vertical stress. "Drained" indicates that excess pore water pressure generated by strains are permitted to dissipate by the free movement of pore water during consolidation and compression.

Consolidated-Undrained (CU) Test - A triaxial compression test in which essentially complete consolidation under the confining (chamber) pressure is followed by a shear test at constant water content.

Confining Pressure ($\sigma 3$) - The isotropic chamber pressure applied to the soil specimen during consolidation and compression.

Maximum Deviator Stress ($\sigma 1 - \sigma 3$) - The difference between the major and minor principal stresses in the specimen at failure. The major principal stress on the specimen is equal to the unit axial load plus the chamber pressure and the minor principal stress on the specimen is equal to the chamber pressure.

Strain Rate - Axial strain, ε, at a given stress level is defined as the ratio of the change in length (ΔL) of the specimen to the original length of the specimen (L_o). The rate of strain was controlled during the test so that this ratio increased at equal increments for each minute of testing.

Back Pressure - Pressure in excess of atmospheric applied to the pore water of a soil sample. Back pressure is usually applied to (1) increase saturation of the sample, or (2) simulate the actual in-situ pressure regime.

K. Unconfined Compression - Test procedures were as described in ASTM D 2166-66. Unconfined compressive strength is

defined as the load per unit area at which an unconfined prismatic or cylindrical specimen of soil will fail in a simple compression test. In these methods, unconfined compressive strength is taken as the maximum load attained per unit area or the load per unit area at 20 percent axial strain, whichever occurred first during the performance of a test.

L. Direct Shear - The procedures of ASTM D 3080-72 were followed for direct shear testing. In this test, soil under an applied normal load is stressed to failure by moving one section of the soil container (shear box) relative to the other section. Normal stress is the value of load per unit area acting perpendicular to the plane of shearing. Maximum shear strength is defined as the maximum resistance (ksf) of a soil to shearing (tangential) stresses.

M. Consolidation (ASTM D 2435-70) - A consolidation test is a test in which a cylindrical soil specimen is laterally confined in a ring and compressed between porous plates. The term "consolidation," as used here, indicates the gradual reduction in volume of the soil mass resulting from an increase in compressive stress (axial load per unit area).

N. Chemical - The chemical tests performed on soil samples included: pH; water soluble sodium, chloride, sulphate, calcium; and calcium carbonate content. pH is an index of

the acidity or alkalinity of a soil in terms of the logarithm of the reciprocal of the hydrogen ion concentration. ASTM test procedure designations for these chemical tests are included in the list on the first page of these Explanations.

O. CBR - California Bearing Ratio (CBR) is the ratio (in percent) of the resistance to penetration developed by a subgrade soil to that developed by a standard crushed-rock base material. The procedures for conducting a CBR test were as outlined in ASTM D 1883-73. The materials tested for CBR were also analyzed for particle-size distribution (ASTM D 422-63) and compaction characteristics (ASTM D 1557-70). The term "percentage of maximum density" indicates the ratio (as a percentage) of the compacted sample dry unit weight to maximum dry density obtained in the laboratory from ASTM D 1557-70, "Moisture-Density Relations of Soils Using 10-pound (4.5-kg) Hammer and 18-inch (457-mm) Drop."

D-10	40.2 - 40.9	12.25 - 12.47							
P-13	71.8 - 72.6	21.88 - 22.13					100	93	93
P-14	81.1 - 81.9	24.72 - 24.96							
P-15	90.6 - 91.6	27.61 - 27.92					100	95	95
D-16	99.3 - 99.8	30.27 - 30.42						100	97
P-1	0.8 - 1.9	0.24 - 0.58							
P-2	3.8 - 4.3	1.16 - 1.31							
P-3	6.8 - 7.6	2.07 - 2.32							
P-4	8.8 - 9.6	2.68 - 2.93							
P-5	11.3 - 12.1	3.44 - 3.69							
D-6	15.2 - 15.7	4.63 - 4.79						100	99
P-7	20.8 - 21.6	6.34 - 6.58							100
P-8	25.8 - 26.6	7.86 - 8.11							
P-9	30.8 - 31.6	9.39 - 9.63							
P-10	40.8 - 41.7	12.44 - 12.71					100	93	83
P-11	50.8 - 51.6	15.48 - 15.73						100	99
P-12	60.0 - 60.9	18.29 - 18.56							
P-13	70.8 - 71.6	21.58 - 21.82							
P-14	80.8 - 81.8	24.63 - 24.93						100	97
P-15	90.8 - 91.7	27.68 - 27.95							
P-16	98.9 - 99.6	30.14 - 30.36					100	92	63
P-1	0.8 - 1.6	0.24 - 0.49						100	98
P-2	3.8 - 4.6	1.16 - 1.40							
P-3	6.8 - 7.6	2.07 - 2.32						100	97
P-4	10.8 - 11.6	3.29 - 3.54							
P-5	15.8 - 16.6	4.82 - 5.06							100
P-6	20.8 - 21.6	6.34 - 6.58							
P-7	25.8 - 26.6	7.86 - 8.11					100	82	78

					SM	106.4	1705	7.6	35.0	0.58				
					SM	99.9	1600	13.5	53.3	0.69				
					SM	104.6	1676	14.4	63.9	0.61				
					SM	105.0	1682	12.6	56.2	0.61				
				NP	SM	113.8	1823	7.5	42.3	0.48				
					SM	102.1	1636	5.3	22.1	0.65				
					SM	117.5	1882	6.5	40.3	0.43				
					SM	105.8	1695	6.6	30.0	0.59				
				NP	SM	106.5	1706	6.3	29.0	0.58				
					SM	104.9	1680	9.9	44.0	0.60				
					SM	111.3	1783	7.9	41.3	0.51				
				NP	SW-SM	108.0	1730	8.5	40.9	0.56				
					SW-SM	106.8	1711	9.9	46.3	0.58				
					SW-SM	107.5	1722	7.8	37.0	0.57				
					SP	109.8	1759	12.4	62.8	0.54				
					SW-SM	104.3	1671	14.7	64.4	0.62				
					SW-SM	113.0	1810	9.7	53.6	0.49				
					SW-SM	111.9	1793	9.3	49.5	0.51				
					SW-SM	112.6	1804	9.1	49.8	0.50				
					SW-SM	113.7	1821	8.7	48.9	0.48				
					GP-GM	112.6	1804	7.2	39.4	0.50				
					SM	95.5	1530	5.5	19.4	0.76				
					SM	106.1	1700	7.5	34.5	0.59				
					SM	107.1	1716	6.3	29.6	0.57				

SATURATION (%)	VOID RATIO	COMPACTED MAXIMUM DRY DENSITY (pcf)	(kg/m³)	OPTIMUM MOISTURE (%)	SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
17.6	0.74									*	
13.6	0.58										
65.3	0.78									*	
68.3	0.66							*		*	
46.6	0.54										
32.1	0.63										
71.5	0.70										
20.7	0.52							*			
43.0	0.60										
35.0	0.58										
53.3	0.69										
63.9	0.61										
56.2	0.61										
42.3	0.48										
22.1	0.65										
40.3	0.43										
30.0	0.59										
29.0	0.58										
44.0	0.60										
41.3	0.51							*			
40.9	0.56										
46.3	0.58										
37.0	0.57										
62.8	0.54										
64.4	0.62									*	
53.6	0.49										
49.5	0.51										
49.8	0.50										
48.9	0.48										
39.4	0.50										
19.4	0.76										
34.5	0.59										
29.6	0.57							*			
40.2	0.55										
48.7	0.66										
46.3	0.73										
47.9	0.58									*	
61.2	0.71										
38.9	0.49										
37.6	0.55										
34.8	0.59										

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SUMMARY OF LABORATORY
TEST RESULTS
PAHROC VALLEY, NEVADA
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30 JUN 81 — TABLE II-9-1

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70.0 - 70.8	21.34 - 21.58						100	99
80.8 - 81.6	24.63 - 24.87						100	99
81.6 - 82.5	24.87 - 25.15							
90.8 - 91.4	27.68 - 27.86							
99.0 - 99.8	30.18 - 30.42							100
0.5 - 2.0	0.15 - 0.61							100
0.5 - 2.0	0.15 - 0.61						100	99
0.5 - 2.0	0.15 - 0.61					100	85	69
0.5 - 2.0	0.15 - 0.61						100	93
0.5 - 2.0	0.15 - 0.61							100
0.5 - 2.0	0.15 - 0.61					100	90	79
0.5 - 2.0	0.15 - 0.61					100	88	75
0.5 - 2.0	0.15 - 0.61						100	99
0.5 - 2.0	0.15 - 0.61						100	97
0.5 - 2.0	0.15 - 0.61						100	99
0.5 - 2.0	0.15 - 0.61					100	93	77
0.5 - 2.0	0.15 - 0.61					100	69	47
0.5 - 2.0	0.15 - 0.61						100	99
0.5 - 2.0	0.15 - 0.61					100	97	88

79	38	19	13					NP	SM	109.7	1757	9.1	46.1	0.54						
68	25	11	7						SW-SM	108.3	1735	13.2	64.4	0.56						
93	58	38	28						SM	108.4	1737	14.9	72.9	0.55						
									SW-SM	110.7	1773	9.9	51.4	0.52						
70	25	12	8						SW-SM	109.3	1751	7.7	38.5	0.54						
79	43	23	18						SM						123.2	1974	10.0	2.66		
89	47	21	16						SM						121.0	1938	11.2			
43	27	16	12						GP-GM											
70	45	18	12						SW-SM											
90	44	16	11						SW-SM											
58	32	14	9						SP-SM						118.0	1890	12.0	2.67		
45	17	6	4						SP											
79	38	21	16						SM											
88	49	28	23						SM											
92	81	64	47						SM											
51	25	10	7						SP-SM											
23	17	12	10						GP-GM											
82	34	16	13						SM											
65	41	27	21						SM											

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COMPACTED									
XIMUM DENSITY		OPTIMUM MOISTURE (%)	SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
)	(kg/m³)								
								*	
								*	
2	1974	10.0	2.66						*
.0	1938	11.2							*
3.0	1890	12.0	2.67						*
								*	
								*	

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SUMMARY OF LABORATORY
TEST RESULTS
PAHROC VALLEY, NEVADA
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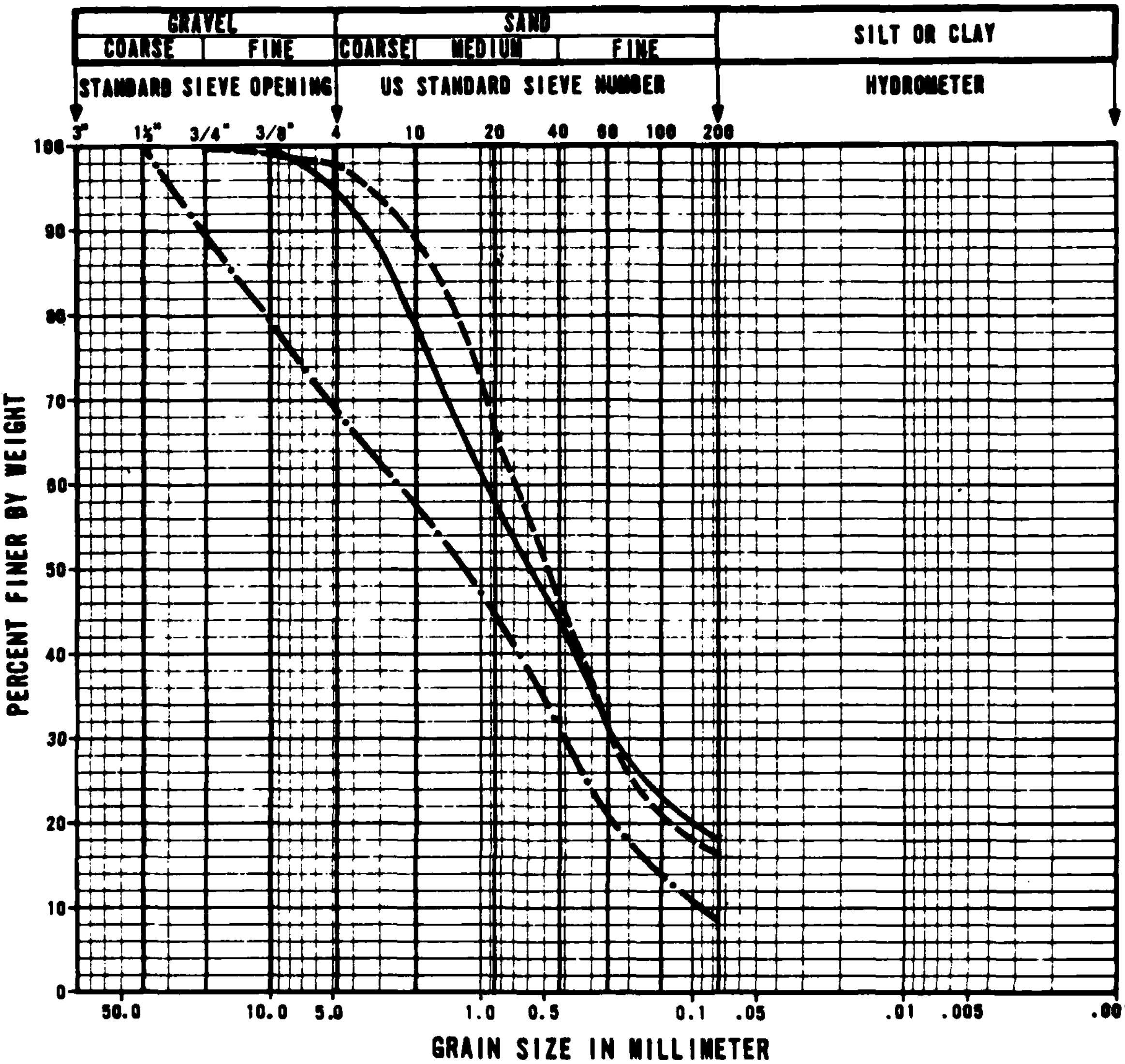
30 JUN 81 TABLE II-9-1

3



SYMBOL	COMPOSITE SAMPLE NUMBER	ACTIVITY NUMBER	SAMPLE INTERVAL FEET	SAMPLE INTERVAL METERS	SOIL TYPE
———	A	PA-T-1	0.5 - 2.0	0.15 - 0.61	SM
— —	B	PA-T-2	0.5 - 2.0	0.15 - 0.61	SM
—·—	C	PA-T-6	0.5 - 2.0	0.15 - 0.61	SP-SM

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GRAIN SIZE CURVES, CBR TESTS
PAHROC VALLEY, NEVADA

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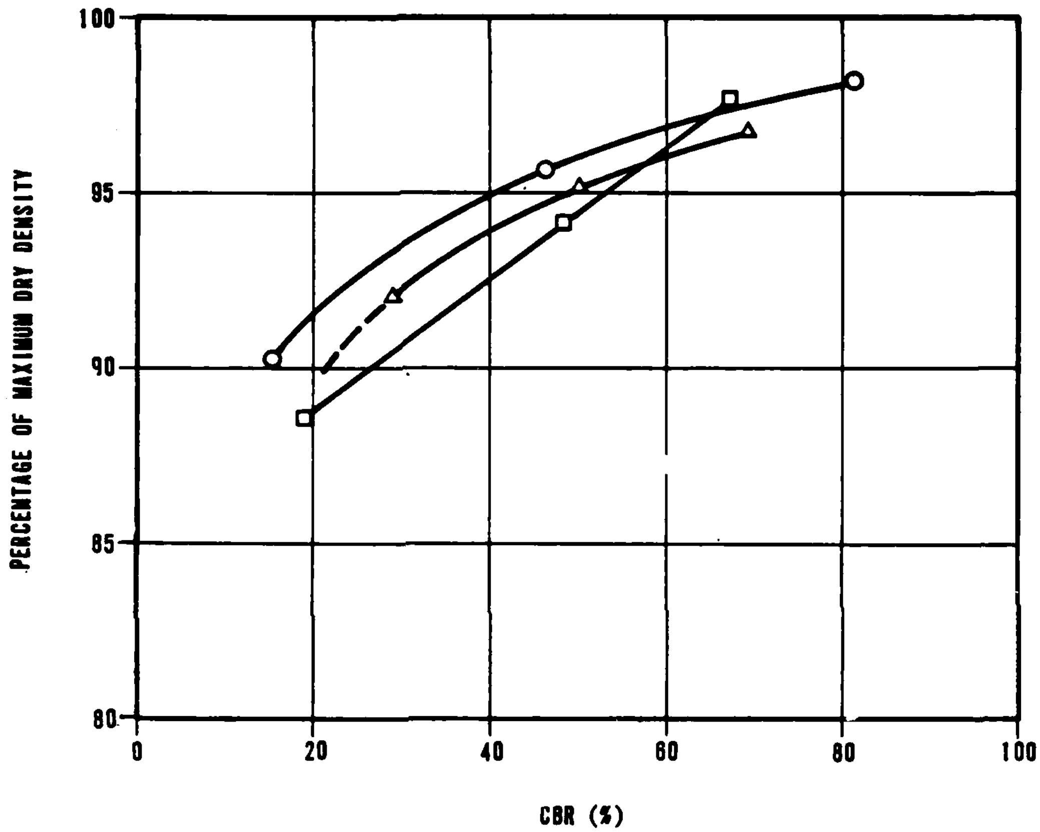
FIGURE II-6-1



SYMBOL	COMPOSITE SAMPLE NUMBER	SOIL TYPE
○	A	SM
□	B	SM
△	C	SP-SM

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CALIFORNIA BEARING RATIO
(CBR) CURVES
PAHROC VALLEY, NEVADA

30 JUN 81 FIGURE II-9-2

BORING NO.	SAMPLE NO.	SAMPLE INTERVAL FEET	SAMPLE INTERVAL METERS	SOIL TYPE	NORMAL STRESS ksf	NORMAL STRESS kN/m^2	MAXIMUM SHEAR STRENGTH ksf	MAXIMUM SHEAR STRENGTH kN/m^2
PA-B-1	P-4	9.3 - 10.0	2.83 - 3.05	SP-SM	1.0	48	1.27	61
					1.5	72	1.84	88
					2.0	96	2.22	106
PA-B-1	D-8	25.2 - 25.9	7.68 - 7.89	SW-SM	2.5	120	3.40	163
					3.8	182	4.68	224
					5.0	239	6.36	304
PA-B-2	D-6	15.2 - 15.7	4.63 - 4.79	SM	1.5	72	2.38	113
					2.3	110	3.83	183
					3.0	144	4.43	212
PA-B-3	P-3	6.8 - 7.6	2.07 - 2.32	SM	0.5	24	0.91	44
					0.8	38	1.12	54
					1.0	48	1.51	72

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DIRECT SHEAR TEST RESULTS
PAHROC VALLEY, NEVADA

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TABLE II-8-2

ACTIVITY NO.	SAMPLE NO.	SAMPLE INTERVAL		SOIL TYPE	pH	WATER SOLUBLE				CALCIUM CARBONATE
		FEET	METERS			SODIUM mg/kg	CHLORIDE mg/kg	SULPHATE mg/kg	CALCIUM mg/kg	mg/kg
PA-B-1	P-1	0.9 - 1.9	0.27 - 0.58	SP-SM	8.4	13	<5	<1	52	113
	P-3	6.0 - 6.4	1.83 - 1.95	SP-SM	9.2	238	112	7	22	212
	P-4	9.3 - 10.0	2.83 - 3.05	SP-SM	9.8	370	170	131	27	71
PA-B-2	P-11	50.8 - 51.6	15.48 - 15.73	SW-SM	8.5	54	11	2	39	243
PA-B-3	P-7	25.8 - 26.6	7.86 - 8.11	SP-SM	8.5	43	11	<1	33	137
	P-12	70.0 - 70.8	21.34 - 21.58	SM	8.3	80	37	23	37	143
	P-14	90.8 - 91.4	27.68 - 27.86	SW-SM	8.5	81	16	<1	38	131
PA-P-12	b-1	0.5 - 2.0	0.15 - 0.61	SM	8.5	77	61	46	51	235
PA-CS-27	b-1	0.5 - 2.0	0.15 - 0.61	SM	7.3	5	35	20	50	183

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SUMMARY OF CHEMICAL TEST RESULTS
PAHROC VALLEY, NEVADA

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TABLE II-9-3

AD-A113 223 ERTEC WESTERN INC LONG BEACH CA F/G 8/13
VERIFICATION STUDY - PAHROC VALLEY, NEVADA. VOLUME II. GEOTECHN--ETC(U)
JUN 81 F04704-80-C-0006
UNCLASSIFIED E-TR-27-PA-2 NL

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DATE
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5 82
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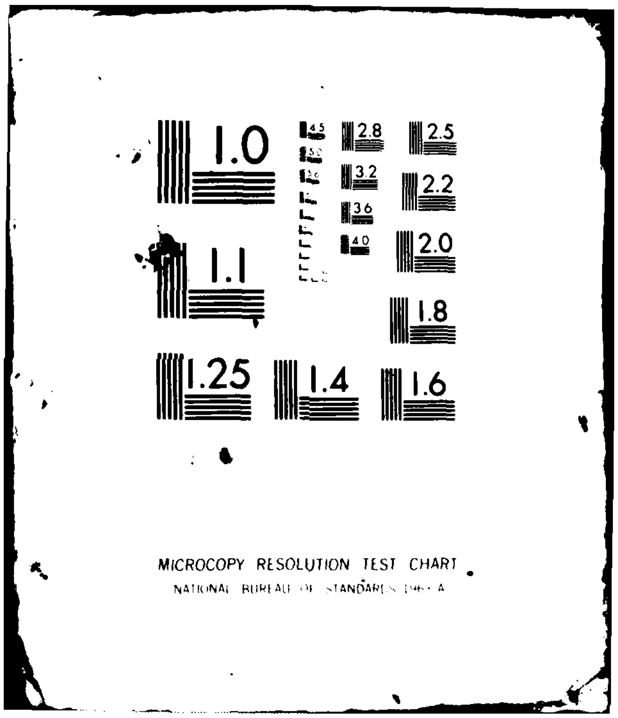
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

COMPOSITE SAMPLE NUMBER	SOIL TYPE	PERCENT PASSING #200	ATTERBERG LIMITS		SPECIFIC GRAVITY	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)	COMPACTED DRY DENSITY		COMPACTED MOISTURE (%)	PERCENT OF MAXIMUM DRY DENSITY	CBR (%)
			LL	PI		pcf	kg/m³		pcf	kg/m³			
A	SM	18			2.66	123.2	1974	10.0	121.0	1938	10.4	98.2	81
									117.9	1889	10.5	95.7	46
									111.1	1780	10.5	90.2	15
B	SM	16				121.0	1938	11.2	118.1	1892	11.6	97.6	67
									113.8	1823	11.4	94.1	49
									107.3	1719	11.6	88.6	19
C	SP-SM	9			2.67	118.0	189.0	12.0	114.1	1828	11.8	96.7	69
									112.3	1799	11.7	95.1	50
									108.6	1740	11.9	92.0	29

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CALIFORNIA BEARING RATIO (CBR)
TEST RESULTS
PAHROC VALLEY, NEVADA

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TABLE II-9-4

10.0 CONE PENETROMETER TEST RESULTS

Explanation: The results of all cone penetrometer tests are presented in this section. Explanations of the test results are as follows:

A. Depth - Corresponds to depth below ground surface.

B. Friction Resistance - The resistance to penetration developed by the friction sleeve, equal to the vertical force applied to the sleeve divided by its surface area. This resistance is the sum of friction and adhesion.

C. Cone Resistance - The resistance to penetration developed by the cone, equal to the vertical force applied to the cone divided by its horizontally projected area.

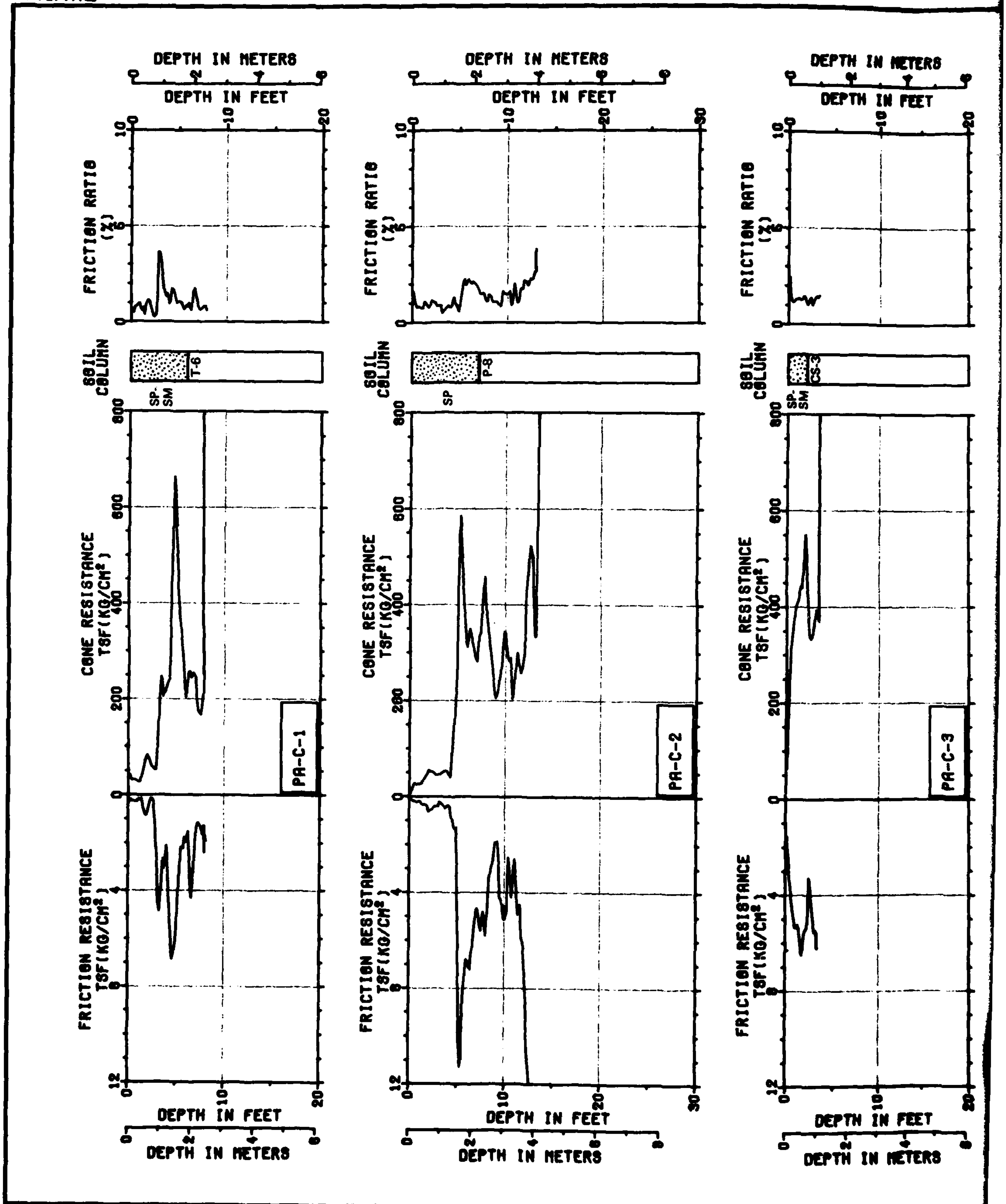
D. Friction Ratio - The ratio of friction resistance to cone resistance.

E. Designation - Each cone penetrometer test is identified by a number: for example C-1.

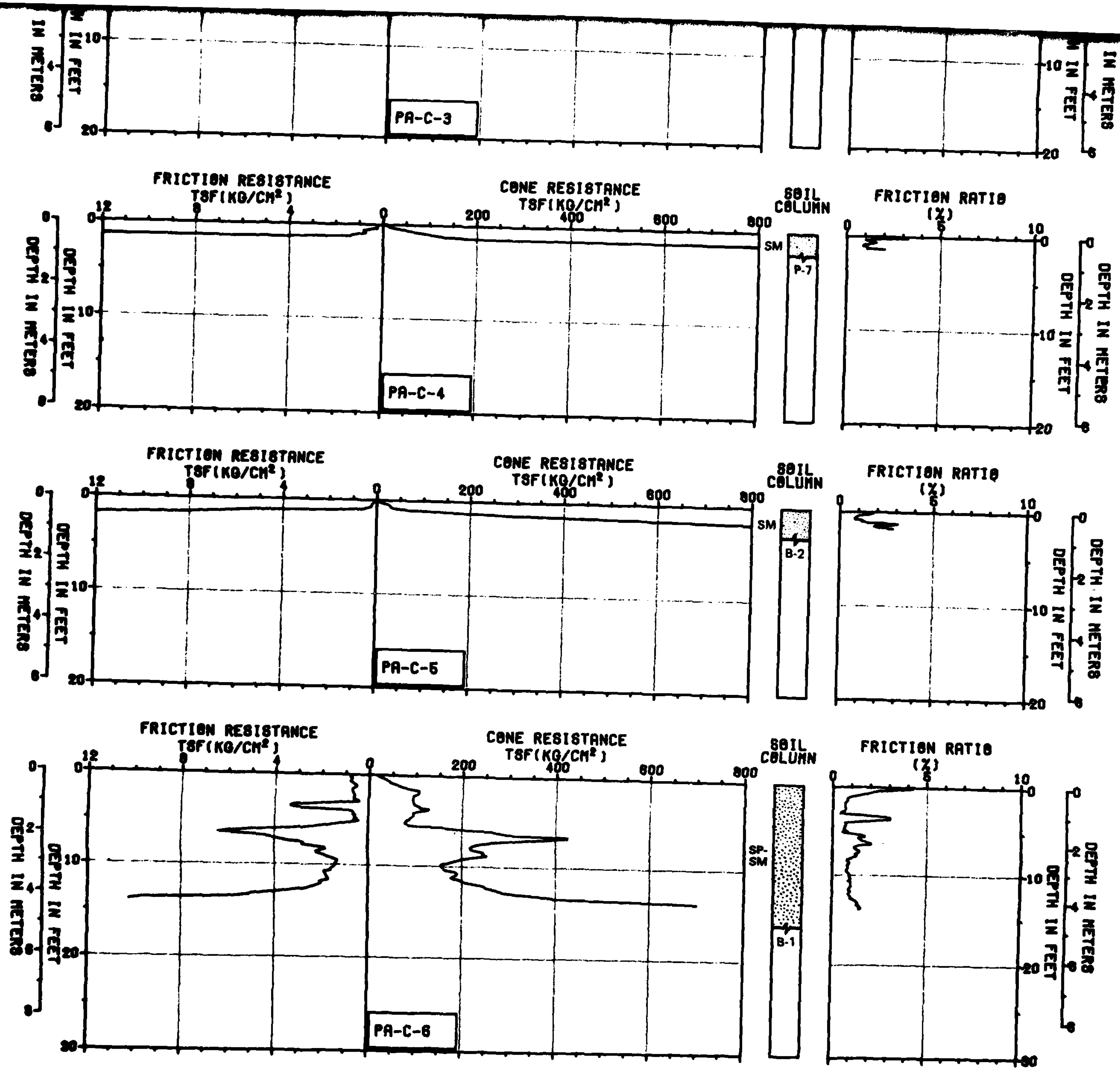
C - abbreviation for the CPT
1 - number of the test

F. Soil Column - A graphical presentation of the soil type versus depth at each cone penetrometer test location. The Unified Soil Classification Symbol (see Table II-6-1) for each different soil type is listed immediately to the left of the soil column. Immediately below the soil column, the activity number for the corresponding boring, trench, test

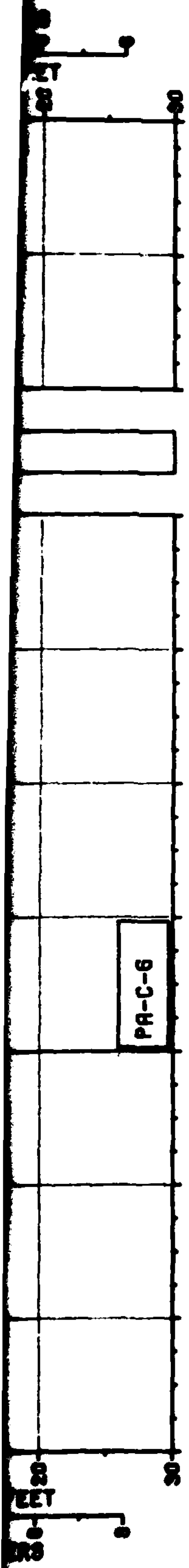
pit, or surficial soil sample at each CPT location is given.



DEPTH IN METERS
DEPTH IN FEET
FRICTION RATIO (%)
SOIL COLUMN
SP-SM
T-6
CONE RESISTANCE TSF(KG/CM²)
FRICTION RESISTANCE TSF(KG/CM²)
PA-C-1
SP
P-8
PA-C-2
CS-3
PA-C-3


PA-C-3
IN METERS
IN FEET
FRICTION RESISTANCE
TSF(KG/CM²)
CONE RESISTANCE
TSF(KG/CM²)
SOIL
COLUMN
FRICTION RATIO
(%)
SM
P-7
DEPTH IN FEET
DEPTH IN METERS
PA-C-4
SM
B-2
PA-C-5
SP-
SM
B-1
PA-C-6

2



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CONE PENETROMETER TEST RESULTS
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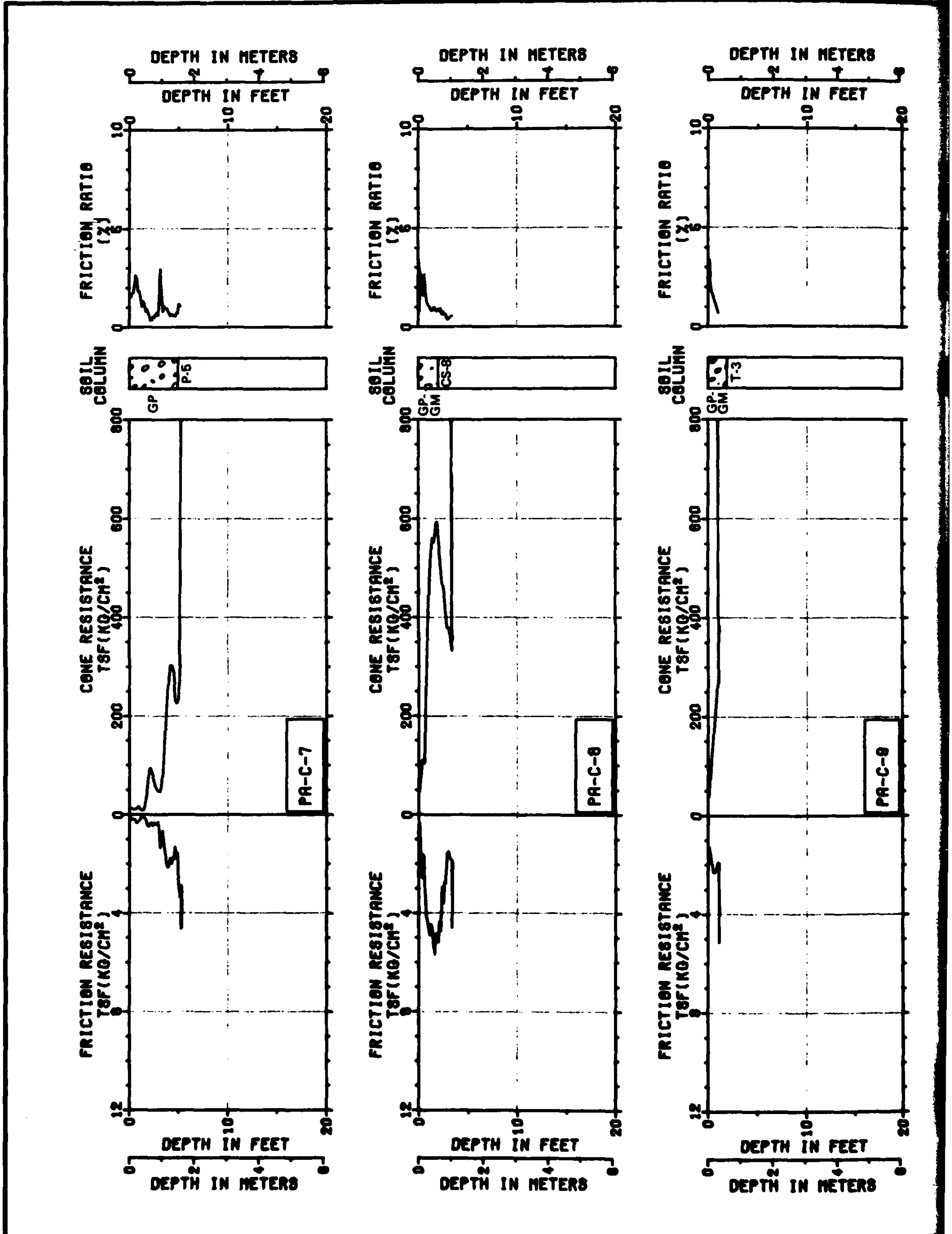
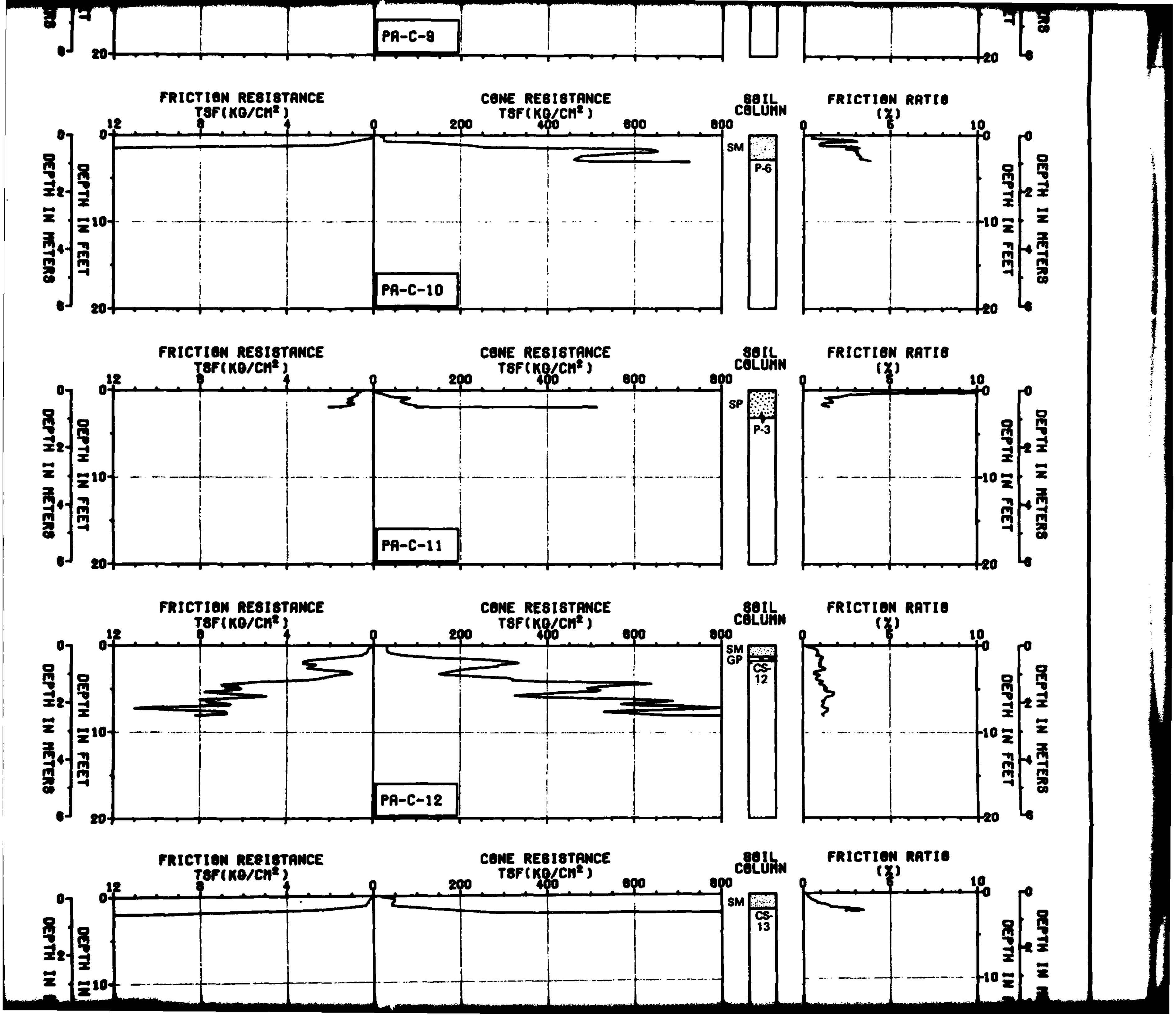
FIGURE II-10-1

3


PA-C-7
PA-C-8
PA-C-9
DEPTH IN METERS
DEPTH IN FEET
FRICTION RATIO (%)
SOIL COLUMN
CONE RESISTANCE TSF(KG/CM²)
FRICTION RESISTANCE TSF(KG/CM²)
GP
P-5
GP-GM
CS-8
T-3


PA-C-9
FRICTION RESISTANCE TSF(KG/CM²)
CONE RESISTANCE TSF(KG/CM²)
SOIL COLUMN
FRICTION RATIO (%)
DEPTH IN FEET
DEPTH IN METERS
SM
P-6
PA-C-10
SP
P-3
PA-C-11
SM
GP
CS-12
PA-C-12
SM
CS-13

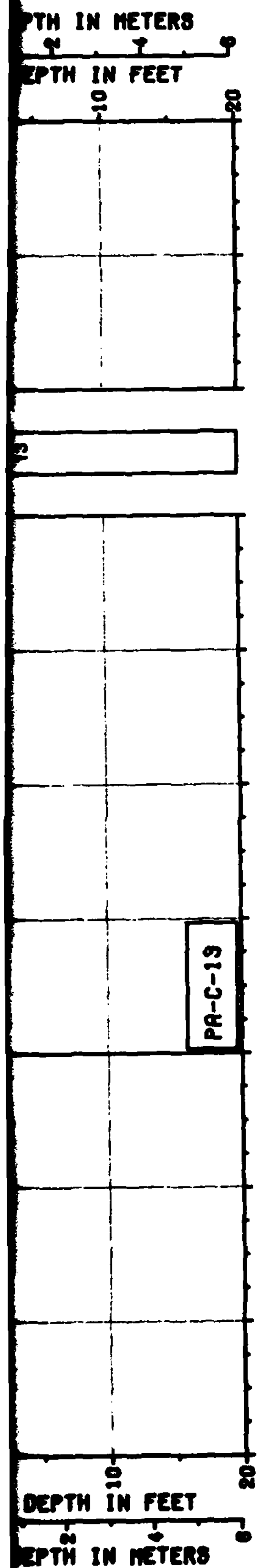


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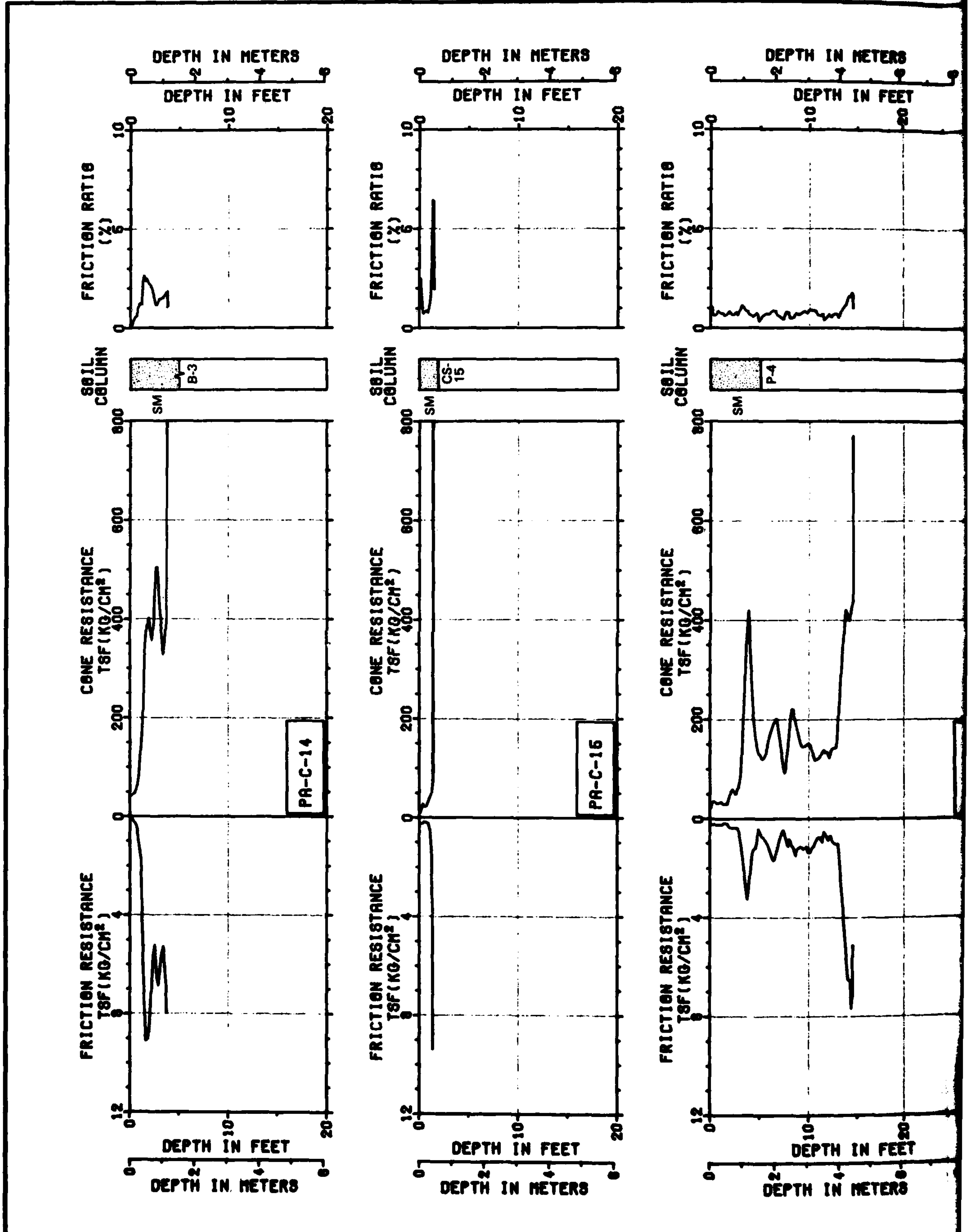
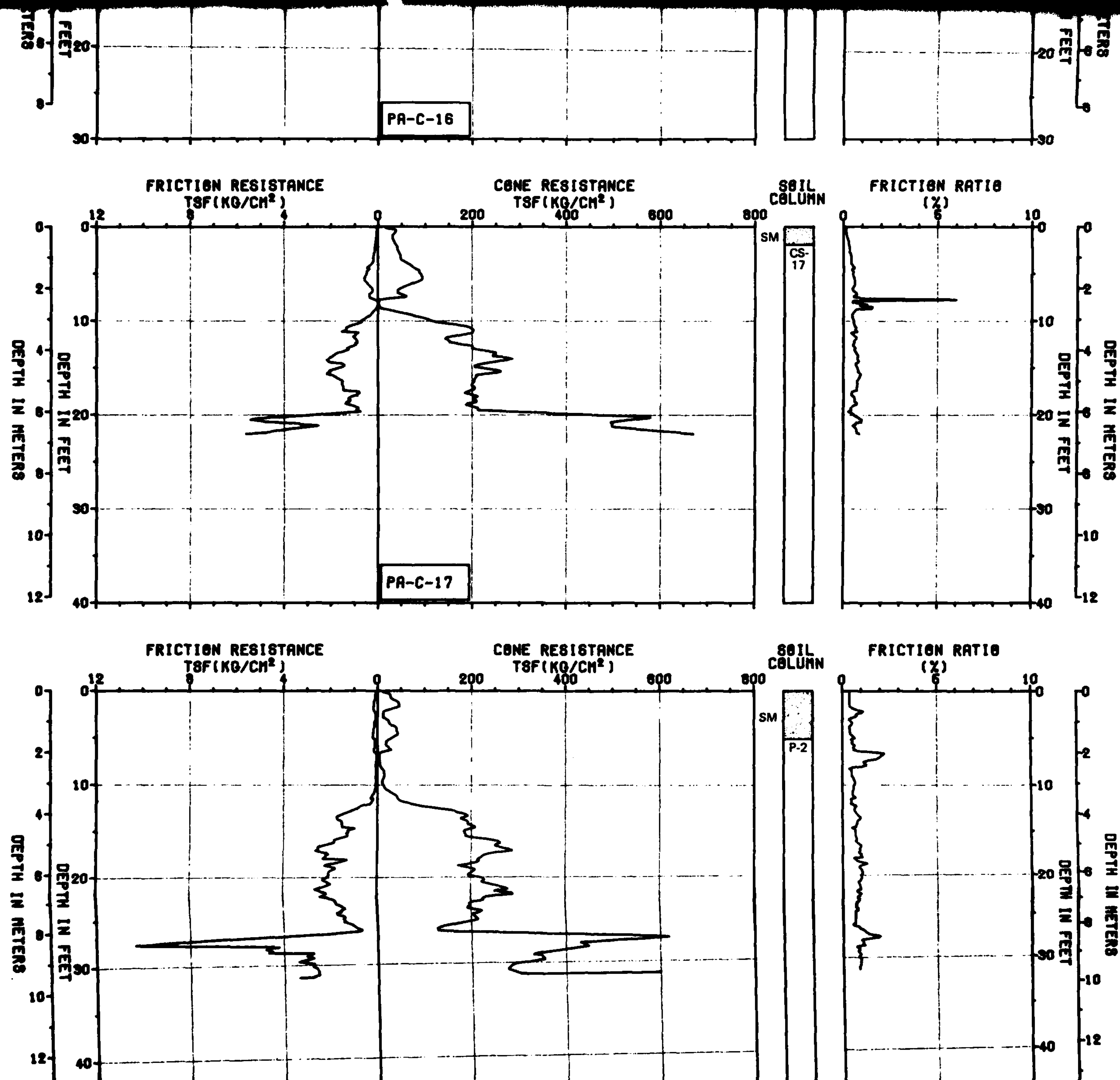
FIGURE II-10-1


DEPTH IN METERS
DEPTH IN FEET
FRICTION RATIO (%)
SOIL COLUMN
SM
B-3
CS-15
P-4
CONE RESISTANCE TSF(KG/CM²)
FRICTION RESISTANCE TSF(KG/CM²)
PA-C-14
PA-C-15

2



PA-C-16
FRICTION RESISTANCE TSF(KG/CM²)
CONE RESISTANCE TSF(KG/CM²)
SOIL COLUMN
FRICTION RATIO (%)
SM
CS-17
DEPTH IN METERS
DEPTH IN FEET
PA-C-17
FRICTION RESISTANCE TSF(KG/CM²)
CONE RESISTANCE TSF(KG/CM²)
SOIL COLUMN
FRICTION RATIO (%)
SM
P-2
DEPTH IN METERS
DEPTH IN FEET

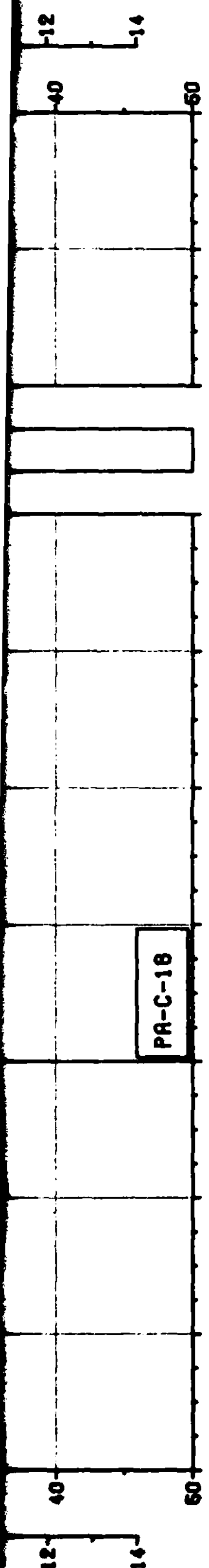


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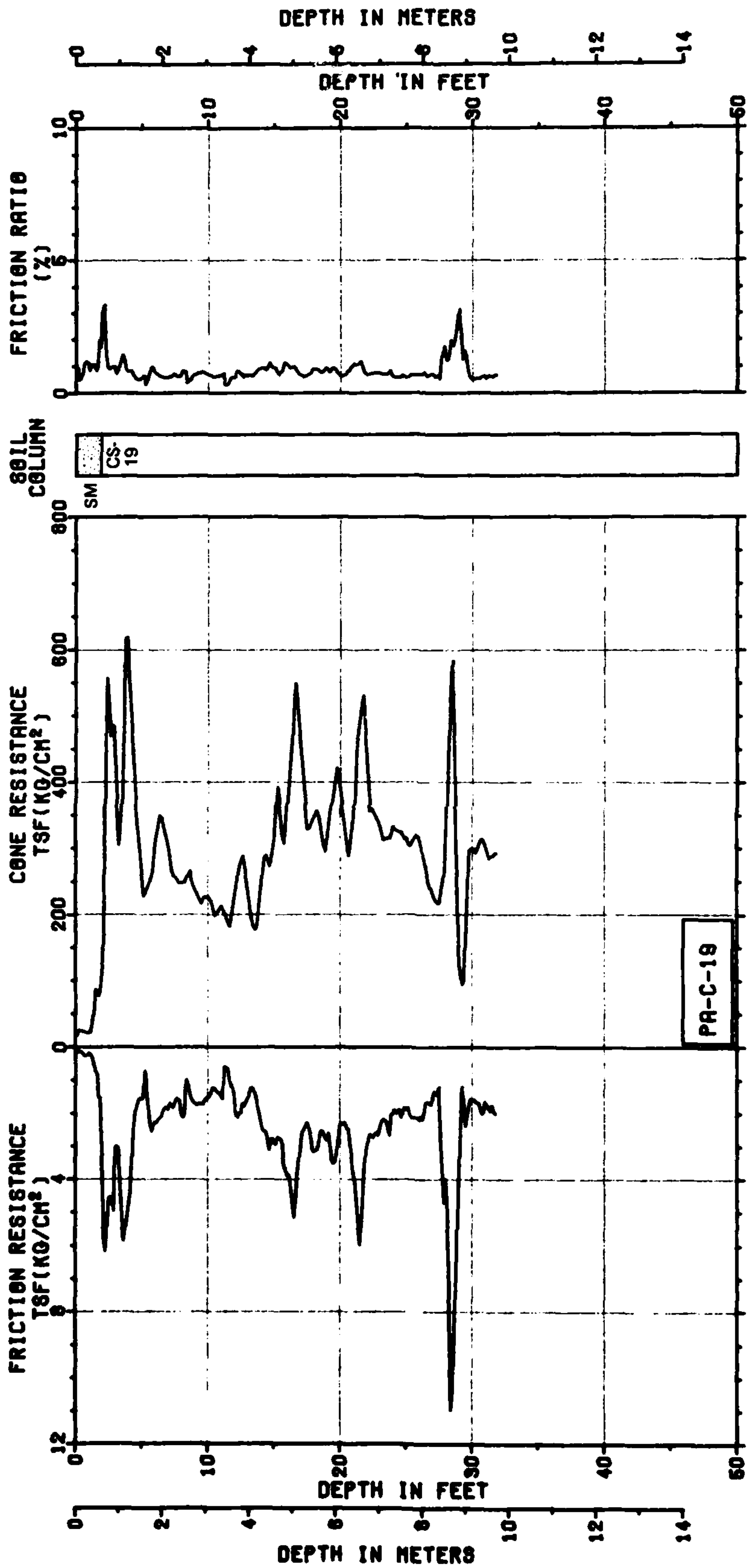
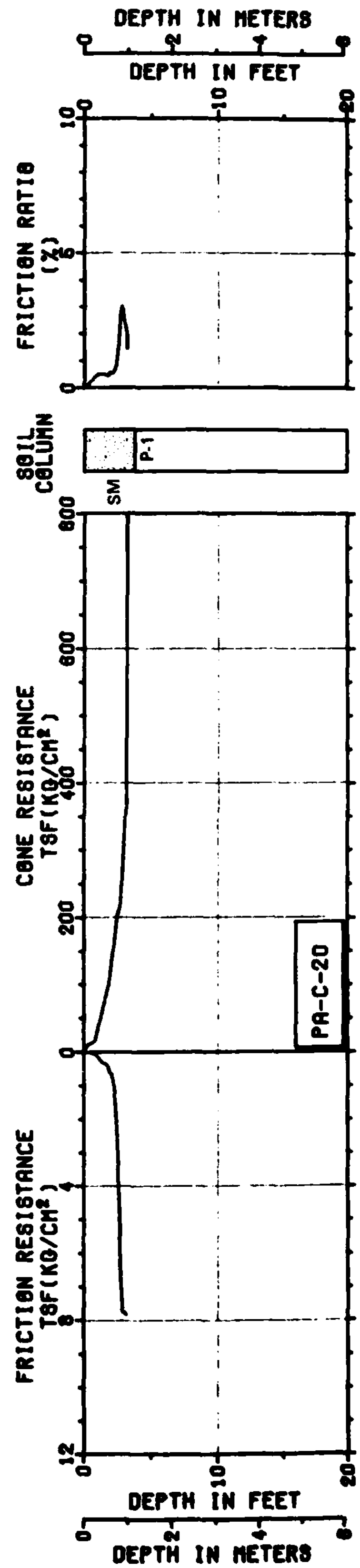
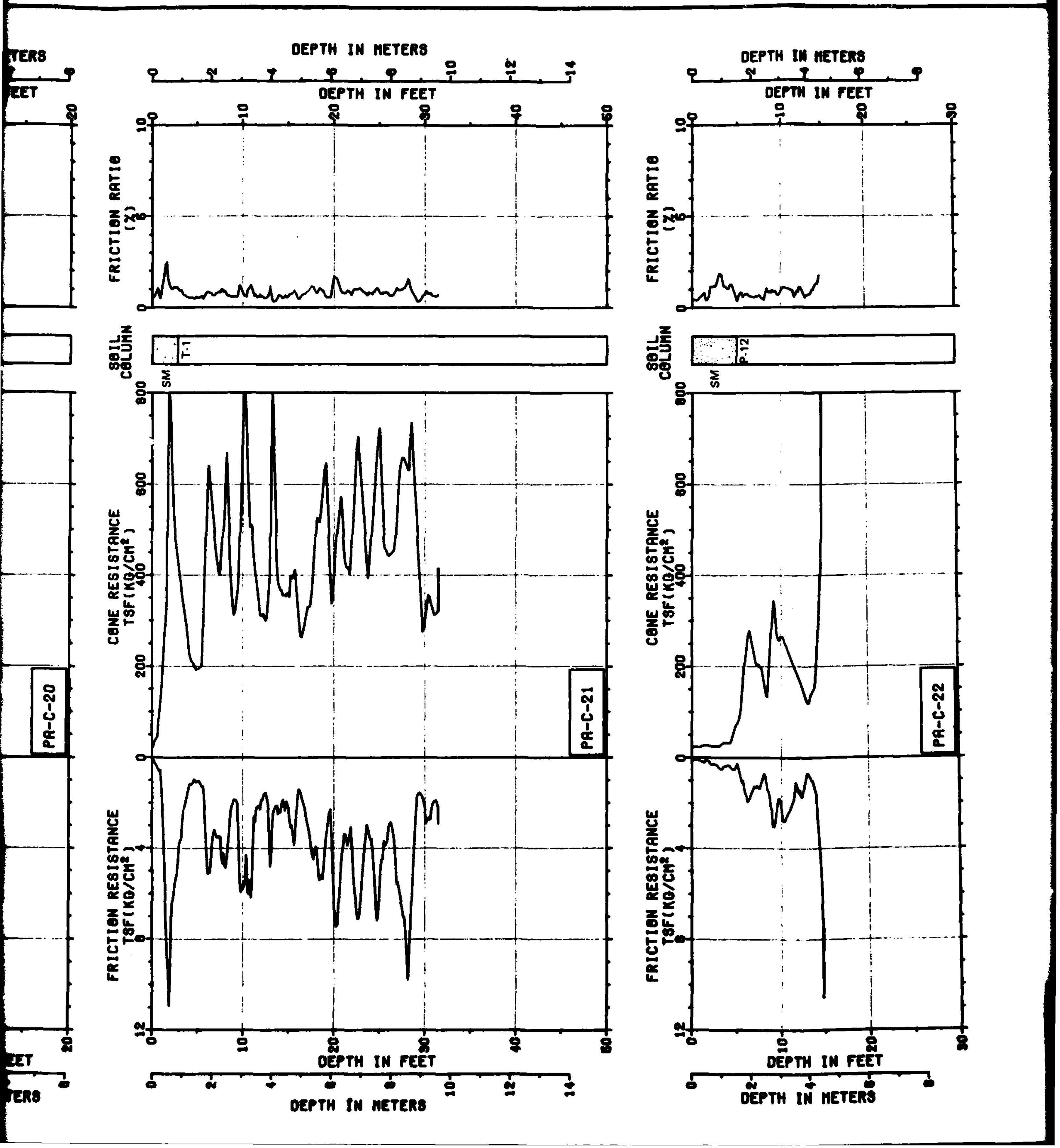
FIGURE II-10-1

3


DEPTH IN METERS
DEPTH IN FEET
FRICTION RATIO (%)
SOIL COLUMN
SM
CS-19
CONE RESISTANCE TSF(KG/CM²)
FRICTION RESISTANCE TSF(KG/CM²)
PA-C-19


DEPTH IN METERS
DEPTH IN FEET
FRICTION RATIO (%)
SOIL COLUMN
SM
P-1
CONE RESISTANCE TSF(KG/CM²)
FRICTION RESISTANCE TSF(KG/CM²)
PA-C-20



DEPTH IN METERS
DEPTH IN FEET
FRICTION RATIO (%)
SOIL COLUMN
SM
T-1
P-12
CONE RESISTANCE TSF(KG/CM²)
FRICTION RESISTANCE TSF(KG/CM²)
PA-C-20
PA-C-21
PA-C-22

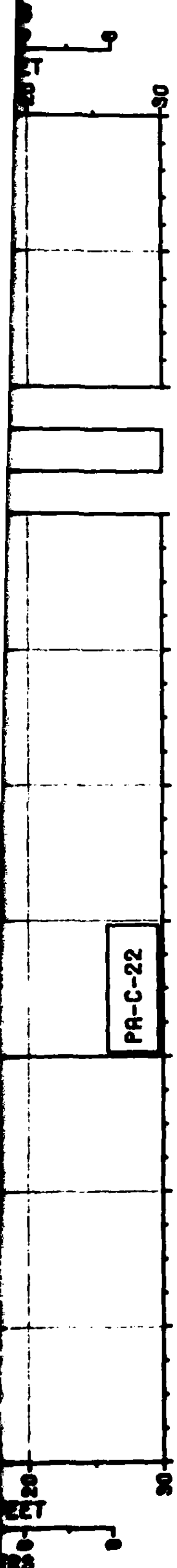


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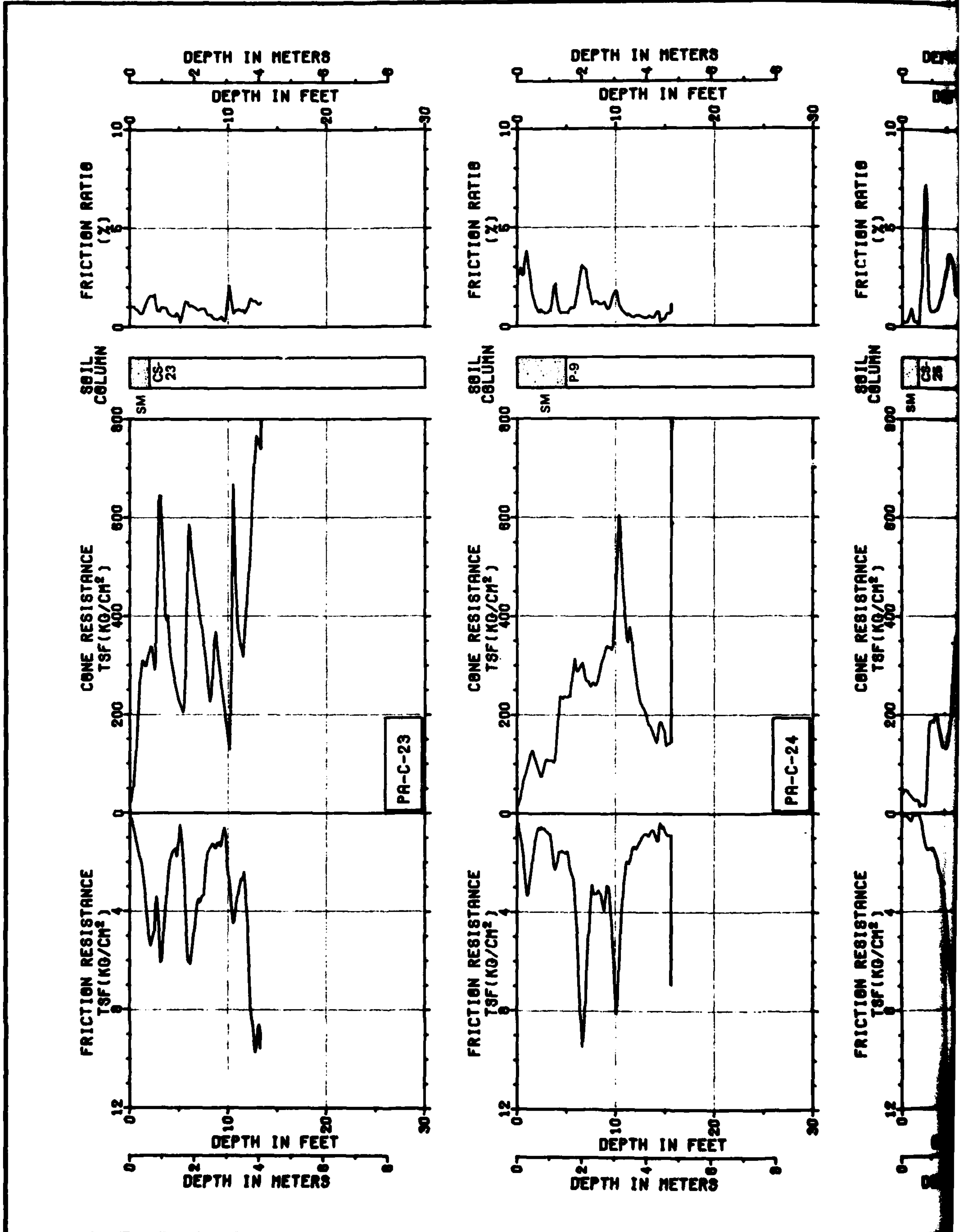
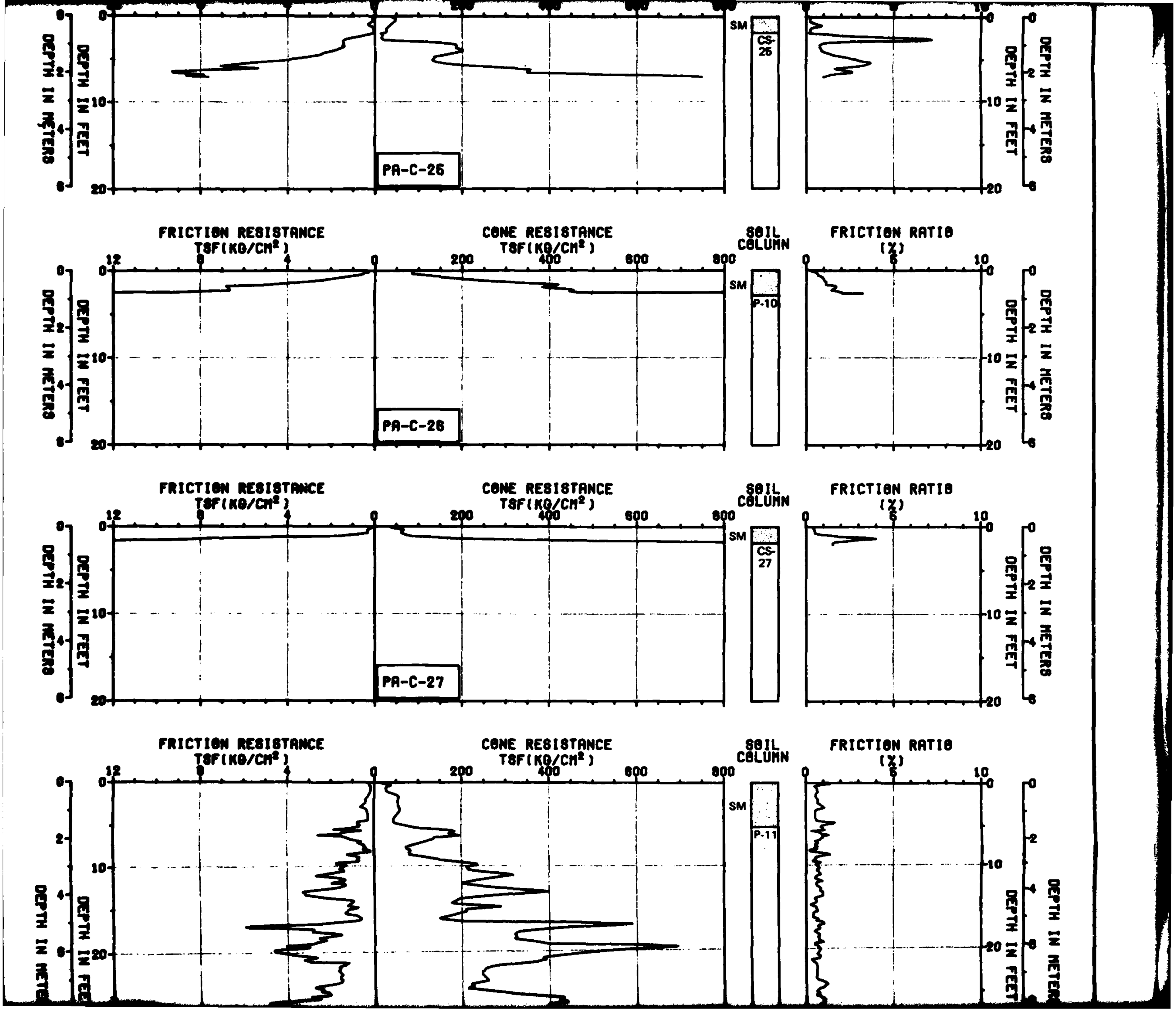
FIGURE II-10-1

3


DEPTH IN METERS
DEPTH IN FEET
FRICTION RATIO (%)
SOIL COLUMN
SM
CS-23
CONE RESISTANCE TSF(KG/CM²)
FRICTION RESISTANCE TSF(KG/CM²)
PA-C-23
DEPTH IN METERS
DEPTH IN FEET
FRICTION RATIO (%)
SOIL COLUMN
SM
P-9
CONE RESISTANCE TSF(KG/CM²)
FRICTION RESISTANCE TSF(KG/CM²)
PA-C-24



PA-C-25
PA-C-26
PA-C-27
FRICTION RESISTANCE TSF(KG/CM²)
CONE RESISTANCE TSF(KG/CM²)
SOIL COLUMN
FRICTION RATIO (%)
DEPTH IN METERS
DEPTH IN FEET
SM
CS-25
P-10
CS-27
P-11

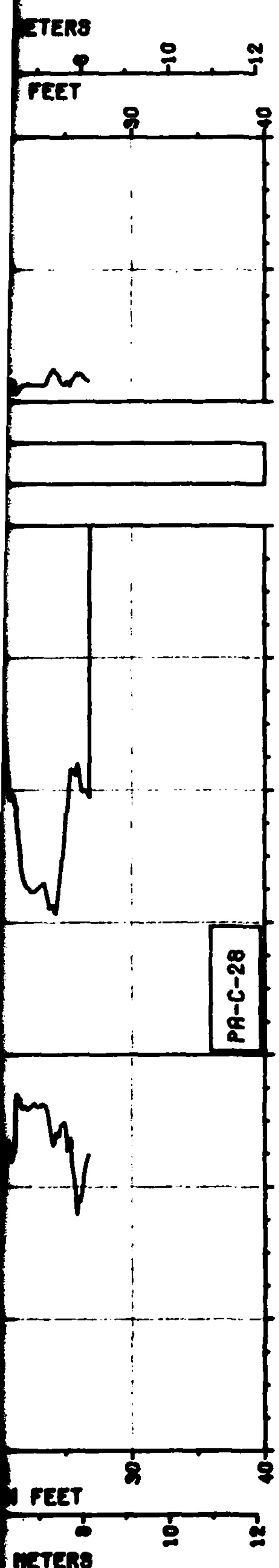


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FIGURE II-10-13

DATE
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